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THE
FAR EASTERN
REVIEW

Engineering
Finance Commerce

Vol. X., No. 9.

SHANGHAI—MANILA

February, 1914.

PROJECTED RAILWAYS IN SZECHUAN,
YUNNAN AND KWEICHOW
PROVINCES

A FULL DESCRIPTION OF THE ROUTES BY WHICH IT IS
PROPOSED TO OPEN UP TO TRADE CHINA'S
MOUNTAIN-LOCKED PROVINCES

THE OIL FIELDS OF NORTH CHINA

MINING IN THE PHILIPPINES

THE TSINGHUA COLLEGE AT PEKING

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THE FAR EASTERN REVIEW

COMMERCE :: ENGINEERING :: FINANCE

VOL. X.

SHANGHAI AND MANILA, FEBRUARY, 1914

No. 9

THE PROJECTED RAILWAYS IN SZECHUAN, YUNNAN, AND KWEICHOW PROVINCES

OPENING CHINA'S WEALTHY MOUNTAIN-LOCKED PROVINCES.

Whatever bearing international politics in railways may have upon the ultimate dominance of western China as embodied in the rich and practically undeveloped provinces of Szechuan, Yunnan and Kweichow, the fact stands out prominent and undeniable that no matter how or by what financial agency railways are built they will be of immense importance in the opening of the resources of the region and be of incalculable benefit to the people in solving their economic problems. Therefore it may not be uninteresting to devote a little attention to this aspect of the great advance towards the destruction of the isolation of "out-back" China that is now being signalled by the granting of rights for the construction of railways into the three provinces and the linking of their capital cities.

The Chinese people and Government have vigorously resisted years of pressure to permit railways to be built with foreign capital into Szechuan province in particular, fearing—and the as yet unborn years might substantially demonstrate that there were solid grounds for apprehensions—that such a thing would augur the loss to China of a province which easily might be developed into a veritable self-contained kingdom. For Yunnan and Kweichow they have not entertained the same regard. Although Yunnan in particular had through the ages supplied the silver, the copper and much of the gold for the use of the Throne and the Government it was not as near to the officials of Peking as Szechuan. More Szechuanese, with their wonderful stories, came down that great and only artery of communication, the Yangtsze-kiang, and Peking officials who braved the terrifying rapids of the upper part of the rivers elected to take for granted what existed on the southern side of the mass of mountains marking the region, and content themselves with any stories that might be told them while enjoying the ease and comforts that could be secured in the great cities of Szechuan. Tales of the wealth of Szechuan thus substantiated by officials were therefore received with greater credence in Peking, and while it was known that Yunnan, the "cloudy south," and Kweichow, the

"precious region," contained treasures which men risked their lives and endured long exile from the centres of civilisation and learning to secure, the provinces were not appreciated so much as was the one of the "four rivers." And, further, Szechuan, being by far the largest of the 18 provinces which constituted China Proper, having an area of 218,533 miles, and a population estimated at over 50,000,000, loomed larger in the official imagination. Yunnan contains but 146,718 square miles, with an estimate of 8,500,000 inhabitants, while Kweichow is still smaller with 67,182 square miles and 7,300,000 inhabitants.

Primarily, of course, the natural physical conformation of the three provinces was the chief bar to mutual familiarity developing

between what might be called the mountaineers and the peoples of the great plains extending eastward to the sea. The easiest avenue of approach from the east was by way of the Yangtsze, and then over ceaseless mountains. The turbulent wall of water, which tumbles through the gorges and which has to be climbed from Ichang upwards into Szechuan, was sufficient to deter any but those who could not avoid it, or who anticipated great benefits, from making the journey, while the difficulties and the hardships of overland travel into Kweichow and Yunnan kept them practically isolated from the other parts of the world. It was only the hardy and the adventurous in the plains who could undertake a return journey, while with the exception of traders, the inhabitants of the plateaux, though capable of great endurance, seldom travelled to-



A corner on the Ichang Gorge at High River, Upper Yangtsze.

wards the sea, though they maintained unceasing intercourse with each other, journeying either by river, where possible, or on foot, with pack animals carrying their belongings. Between the inhabitants of Szechuan, Yunnan, and Kweichow there are many characteristics in common, and the conditions of life bear close resemblance. Climatically, too, there is similarity, and they are as alike in their fogginess as they are generally in their isolation.

The routes mostly followed by the trading men of the plains to Szechuan and the north of Yunnan and Kweichow were by way of the Yangtsze; to central Kweichow by way of the Mandarin

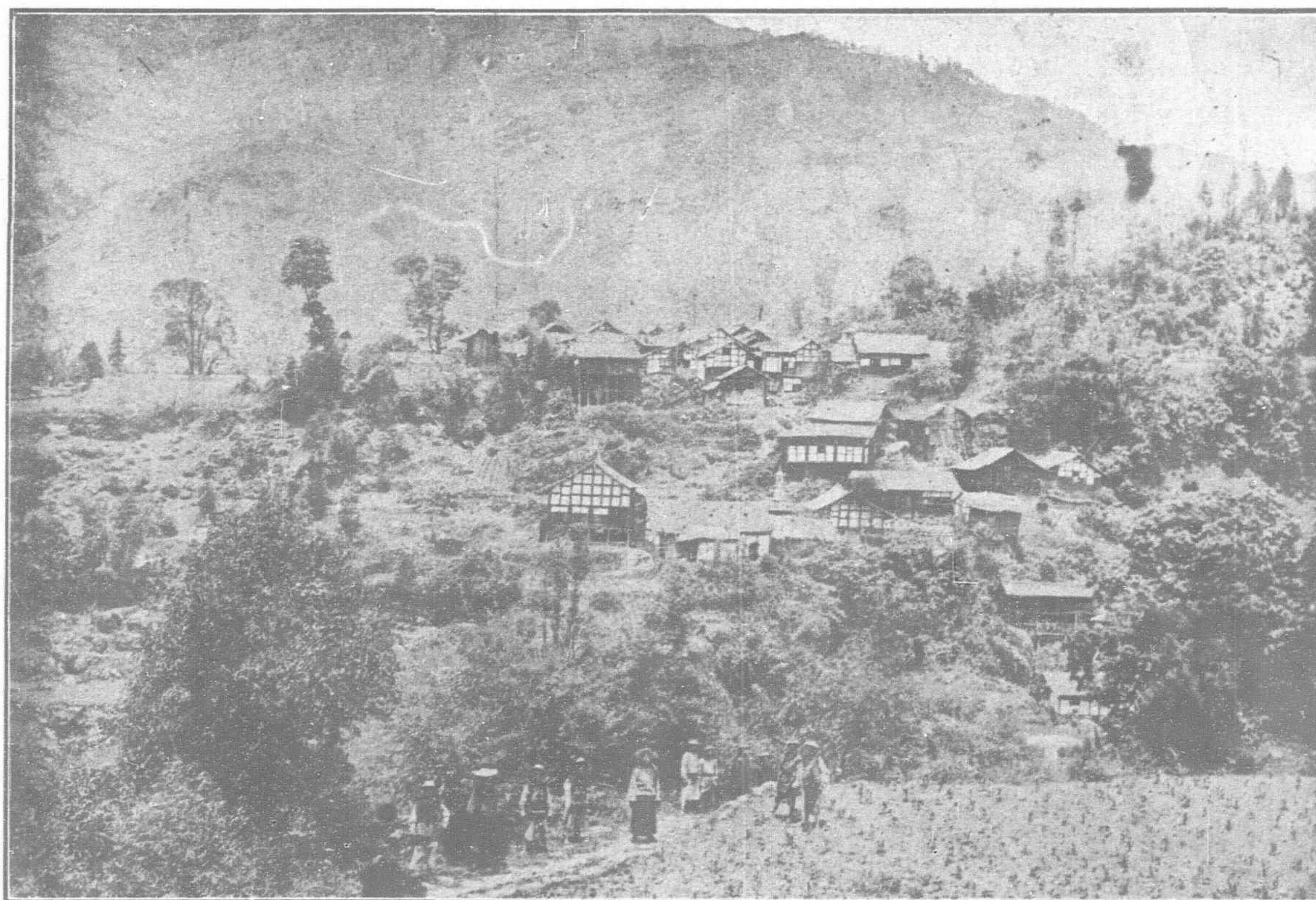
road from Changsha in Hunan, up the Yuan river valley and over the mountains to Kweiyang, the capital; and to central Yunnan by way of the rivers from Canton and by mountain paths to Yunnanfu, or from Indo-China either up the Red River, or over the mountains. All these journeys were tedious and long. But the routes selected and traversed for centuries are those which were the easiest, and which, difficult as they are, will in a measure furnish the routes for the railways that now are to be laid to annihilate distance, time, and heart-breaking mountain barriers. Though most of the rivers of Yunnan and Kweichow are not navigable, they will, to a tremendous extent, facilitate railway construction, for it will be through their tortuous valleys that the engineers will be able to locate the lines which will eventually carry the trains of civilisation and modern economic benefits into the mountain locked region.

Of the difficulties of establishing railway communication much might be written. Szechuan is virtually covered with high mountains interspersed with rich valleys. In the east the chains run in a north-easterly and south-westerly direction rising to 6,000 feet: then the great Red Basin containing the rich plain of Chengtu, the capital, with an elevation from 650 to 1,900 feet above the sea, broken by confused hills rising to 2,000 feet above the plains, leads westwards towards Tibet, which is cut off by massive ranges up to 19,000 feet high, and northward to chains up to 8,000 feet which form the boundary of Kansu province. In the mountain area high peaks, gorges and chasms, and long, roaring torrents are the feature: on the plains the fertility, the irrigation, the primitive methods of mining, and the industry in agriculture of the population are the chief characteristics which attract the observer.

The latter conditions are similar on the high tablelands of Yunnan and Kweichow, though both possess the additional advantage in some respects of a torrid and tropical climate. Yunnan is, however, more distinctive than Kweichow in its climatic varieties. Where it marches with Tibet the lofty mountains are covered with perpetual snow, and are cleft by deep gorges filled with heavy and suffocating air, but to the east the bulk of the region is composed of plains with an altitude of 6,000 feet, and hills rising another 3,000 or 4,000 feet above them. Near the Yangtze there are high peaks, gorges and deep chasms, with a sparse population, and a damp, unhealthy climate. In the south there is tropical verdure, and to the east there are "large and verdant plains, now encircled with boundless horizons, now studded with mounds and hills, but everywhere abounding in marshes, lakes and rivers. The sky is pure, the temperature mild and pleasant, while the population is concentrated in the valleys and near the lakes." In the limestone regions fir-trees cover the mountains, while in those of schist formation splendid forests abound. In the north-east on the

boundary of Kweichow is a broken mass which extends well into Kweichow.

Sugar loaf peaks characterise the mountain masses of Kweichow, which is also a great tableland, with a mean altitude of 4,200 feet, the valleys in the south-west, however, attaining an elevation of 6,500 feet above the sea, the peaks rising to 9,000 feet. Basin-shaped depressions mark the tableland, which is intersected by rivers running torrentially in narrow and deep gorges. Abruptly it descends on the south and, again to use the words of Pere L. Richard "it is through a series of steps that a passage is effected from one valley to another." The Chinese proverb has it that seventh-tenths of Kweichow province are mountains, though they are less elevated than Yunnan and the climate is less healthy. Likewise Kweichow differs from Yunnan in that it has not the lakes and rivers, and its soil lacks the fertility of its south-western neighbor. In general, while the physical conditions of Kweichow have compelled observers to describe them as a "sea of mountains," those of Yunnan have been likened to "an immense staircase" in the north-east, while in the west and south they form "a vast field furrowed with long and deep ravines."



Yunghsien District, near Yachow, Szechuan

Thus, then, the orographic character of Szechuan, Kweichow, and Yunnan is the chief barrier to railway communication, and has been for ages the reason for the comparative isolation of those three provinces. But the engineer with modern methods can overcome the natural obstacles, and is at work overcoming them, the only question to be considered in the task being—cost.

All construction work will be difficult, cutting, tunnel-

ling, and bridging, though more of the two former than the latter, and costs of operation will be determined by the gradients. Plateaux have to be scaled in each province, but the great obstacles are the cross mountains, the deep gorges and rocky chasms, which combine in making the finding of levels difficult.

Major Davies, in his report on a reconnaissance from Burma to the Yangtze estimated that a metre gauge railway would cost for the 1,000 miles from £15,000,000 to £20,000,000. This line run would run from the Kunlong ferry to Suifu, on the Yangtze, via Yunnanfu, and traverse difficult country, necessitating at times a grade of one in 25, with possibly a few short lengths of rack. The heaviest of the grades are encountered near the Yangtze, a section over which the line to connect Chungking with Yunnanfu must run.

The cost of the 288 miles of the railway which runs through Yunnan and connects Indo-China with Yunnanfu, was £6,600,000, according to official figures. Other authorities place it higher, but the tremendous difficulties encountered in building this railway will be repeated on whatever line is brought into the province from any other direction. Apart from the immense task of mounting the plateau and penetrating the ultimate

appalling gorges set before the French engineers for solution, the death rate among the workmen who had to toil in the jungle fastnesses of the fever laden Namti Valley was terrible, and the labor problem was almost as great as the physical obstructions. On the Yangtze side of the province fever is likewise to be feared and, also, it may be expected when work is being done—if it is undertaken—on the line from the West River valley, on the south-east.

Mr. K. S. Low, who surveyed this route from Poseh considers that it will cost to build the 435 miles from that place to Yunnanfu some \$51,000,000 (about £6,375,000). On the railway now in course of construction from Hankow to Szechuan along the Yangtze it is estimated that it will cost anything from £15,000 to £20,000 per mile. It is to be said, however, that so far no engineer's report has been made on the line.

Thus we are able to get a fair idea of the cost per mile of entering Szechuan and Yunnan from four different routes, and those figures might also be applied to Kweichow, though Mr. H. C. Carter and staff of engineers who are now making a reconnaissance over the line from Shasi, on the Yangtze, to Shingyifu, in the southwest of Kweichow province, will furnish an estimate in a few months which will settle any doubts so far as that route is concerned.

The lines which China has contracted to build in

Szechuan, Yunnan and Kweichow are as follow:—

From Hankow to Chengtu, via Chungking	
approximately	1,100 miles
From Chungking to Yunnanfu, approximately	570 ..
From Yunnanfu to Yamchow, via Nanning	
approximately	660 ..
From Shasi to Shingyi, with a branch to	
Changsha from Changteh, approximately	760 ..
Total	3,090 miles

The estimated cost in Mexican currency for the engineering work on the line into Szechuan from Hankow to Chengtu is as follows:—On the section from Hankow to Ichang, \$67,000,000:

From Ichang to Kweichow (in Hupeh),	\$15,000,000;
From Kweichow (in Hupeh) to Chungking,	\$81,000,000;
From Chungking to Chengtu,	\$72,000,000.

These figures are approximate only, but they give a total of \$235,000,000, and to that amount has yet to be added the financial charges in connection with the raising of the loan, etc., which can be estimated at about a third more, or say, a total of \$313,333,333. This would work out at something like £28,000 per mile. A proper study of the country to be traversed may reduce these figures, but they are given because they are the ones which the financiers will have to consider in determining the amount of the loan to be raised for the purpose of the railway.*

What is demonstrated by these figures is that the cost of putting a railway into Szechuan, Yunnan or Kweichow will be in the vicinity of at least £20,000 to £28,000 per mile for the

* See note at end of this article.

mountainous parts, and, as all the routes are beset with heavy masses of mountain, it is likely that the average cost per mile for the whole system will not be less than from £15,000 to £20,000. Taken at £18,000 per mile it will mean that to build the minimum of 3,090 miles China will have to expend £55,620,000 at least.

The question whether this expenditure is justified is answered by the importance of the territory to be covered; the value of the undeveloped wealth which it undoubtedly contains, and the extent of the population which will be benefitted. In China, railway building differs from similar work in countries such as Canada, America and Australia, where lengthy lines have been run into the vast uninhabited spaces to which settlers have only been induced to go by the fact that a railway has been built. The *raison d'être* of railways in the primeval parts which have

been opened up in the new countries, is the creation of new settlements, but that does not, to any such extent, actuate those who open communication in China. Here, for centuries, populations have spread to the uttermost ends of the country, and the traveller to any part of the vast regions to-day may find wherever he goes large walled cities, prosperous towns, and continuous cultivation. Populations in China are virtually waiting for railways wherever any length of line might be laid.

Out in Szechuan,

Yunnan, and Kweichow there is trade. It has been going on for æons. There are big populations in Szechuan in particular, and had the Mahommedan rebellion (1856-1872) not devastated and depopulated Yunnan and Kweichow those provinces would have been peopled like the provinces less seriously affected. Railways are needed in these provinces not only to open up communication, but also to develop the vast mineral and agricultural wealth, the former of which has not yet been touched on scientific lines. They are also required for even a still more important reason and that is to enable the Central Government of China to strengthen its hold upon possible seats of rebellion, and to assist it to defend its frontiers.

With a progressive Government energetically devoting itself to the betterment of the country by liberal laws for the advancement of commerce and industry, railways to the three provinces should pay, apart from possibilities of large passenger traffic. All three are possessed of great deposits of silver, copper coal and iron, with the addition of gold, salt, zinc, quicksilver, argentiferous lead, etc. Agricultural produce grows in Szechuan, Yunnan, and at least the south sections of Kweichow, in abundance—with no markets other than these near at hand. The people have more than they can consume, and therefore crops are grown mostly for self-sustenance.

Wheat and barley, maize, millet, buckwheat, sesamum, rice and fruit of different kinds such as apples, pears, peaches, walnuts, quinces, and cherries are grown in abundance, and the extremely excellent grazing grounds permit of the breeding of large flocks of sheep, herds of ponies and cattle. Pigs thrive in abundance, the staple meat of the people



A Scene in Kweichow, near Panghai

being, in fact, pork. There would be offering for export the valuable mineral products, as well as cereals, hemp, livestock, horns, hides, etc., while the imports would be raw cotton, piece goods, kerosene, cigarettes, and the hundred and one articles of European manufacture which the Chinese have a predilection for. As Colonel Manifold says of the inhabitants of Szechuan, so of the people of Yunnan and Kweichow; they, "like most other Chinese, and unlike most other eastern nations, require no education to make them appreciate articles of foreign manufacture. It is only necessary to develop the natural resources of the province and to give its population facilities for securing a market to ensure that the money is forthcoming. The Szechuanese will then buy everything that he thinks will wear better than the home made article, or which he is unable to make himself, or which will be of advantage in saving labor."

Railways built at such a heavy initial cost could not, of course, become an immediately paying commercial speculation, but they would pay the Central Government in many directions, and with proper handling, under expert traffic officials, combined with a judicious forward industrial policy on the part of the Government, might easily be brought to the paying stage in a very short space of time.

Insofar as the French railway from Haiphong to Yunnanfu is concerned it must be understood that it is not being conducted in a manner to inspire confidence and encourage trade*, nor is it operated with the idea of benefiting other trade than French. Were the line from Haiphong controlled with the interests of Yunnan and the railway as the first consideration, and not subordinated to the interests of French trade in particular, it would tell a story different from that which it does tell.

However, to obtain some idea of the portion of the trade which, in both Szechuan and Yunnan can be checked, it is necessary to turn to the reports of the Maritime Customs Commissioners in the few remote open "ports" in those provinces. While the details for the year 1913 are not yet available the total collections at the "open ports" of Chungking (Szechuan), Mengtsze, Szemao and Tengyueh (Yunnan) were.—

Chungking	†Haikwan Taels	411,195
Mengtsze	" "	365,852
Szemao	" "	6,454
Tengyueh	" "	64,482

In 1912 the Revolution naturally affected trade in the distant parts, and that fact should be remembered when considering the

*Attention is drawn to an article which appeared in the FAR EASTERN REVIEW of September, 1912, entitled "Closing the Door in Yunnan," which sets out the manner in which trade other than French is discriminated against.

†The Haikwan (or Customs) Tael equalled during 1912 3s. 0½d. in English money; 74 cents U.S. Currency; 3.85 Marks; 1.49 Yen; and 152. Mexican Currency.

trade of that year in provinces so far removed from the sea as Szechuan, Yunnan, and Kweichow. At Chungking, however, the returns were very little less than in 1913, Taels 404,482 being collected, as against Taels 378,889 in 1911 (also a year of revolution, particularly in Szechuan) an increase of Taels 25,593. The interesting point is that the *export* tables show that the increase of exports for 1912, as compared with 1911, amounted to Taels 48,051 and Taels 31,664 as compared with 1910. The net value of *foreign goods* imported, direct and coastwise, was Taels 7,815,401, a decrease of Taels 4,743,999 on the corresponding figures of 1911. The Commissioner of Customs at Chungking particularly refers to the manner in which foreign trade was benefitting local people by citing a rise of 15 to 20% in a new article of export for the foreign market, an increase which went mainly into the pockets of the producers; this despite the absence of all but most perilous communication. What these perils are is also indicated by the Commissioner when he says that during 1912 inward bound junks to the number of 240 were either wrecked or stranded at the rapids. No mention is made of the disasters to junks bound down-stream. The total value of imports and exports was Taels 26,872,475 as against Taels

32,308,635 in 1909, showing the effect of the revolution of 1911-12.

The Ichang Commissioner reported that in 1912 the export of hides, skins, and wheat had more than trebled, vegetable tallow rose from 12,041 piculs in 1900 to 30,047 piculs; varnish was almost doubled; nutgalls increased fully four times; leaf tobacco rose 150 per cent, while coal also rose 150 per cent.

In Yunnan trade was also affected by the revolution, yet at Mengtsze

the Customs experienced a record year. The net value of the foreign trade reached a total of Taels 19,569,689, and the Commissioner says, "with the aid of outside capital the Government of Yunnan will be able to extend its railway system and develop the mines with which it is so richly endowed." The collections for the year were Taels 361,244, as against Taels 245,383 for 1911. Chinese goods exported were valued at Taels 11,847,849, compared with Taels 6,750,304, the enormous increase being due mainly to the output of tin at the Kokiui mines—95,624 piculs in 1911 and 138,331 piculs in 1912. The Commissioner adds that "the washing and smelting plants imported in 1910 and 1911 by the Kokiui Tin Mining Company are at last in working order and were completed during the year by the installation of an electric plant, and an important increase in the output of tin and an improvement in its quality are therefore keenly anticipated in the future. The exploitation of a new tin mine is being started at the foot of the Kokiui mountains, in the Mengtsze plain, by another company. Zinc (spelter) rose from 2,732 piculs in 1911 to 12,494 piculs but the great distance of the producing centres, Tungchwanfu, in north Yunnan, and Hweilichow, in south Szechuan, on the left bank of the Yangtsze—both far from actual railhead (Yunnanfu)—precludes the idea of a much-



View of Tzeling, a Salt Centre of Szechuan Province

developed exportation for the present." This particular fact of long distance portage to reach the railway is noteworthy. "In August the Railway Company (French) raised its freight on tin for Haiphong from \$40 to \$45 per ton of 1,000 kilos, a measure which was felt very much by the merchants *and will hasten the construction of the Yunnan-Kwangsi railway.*" The italics are ours. This reference to the mineral development bears out the arguments advanced as to the necessity of railways to these distant provinces, and the mention of the increase in freights on the French line substantiates what is said in another part of this article in reference to the freight rates on the Yunnan-Haiphong line.

At the remote port of Szemao in southern Yunnan the volume of trade reached Taels 262,801, the value of foreign goods imported being Taels 219,578, which was carried by 5,187 men and 19,698 pack animals.

At Tengyueh, another remote port in the far south-west, served only by carriers or pack trains, the foreign goods imported reached Taels 1,842,000, nearly 78% of which were sent inland under transit pass. Chinese goods to the value of \$682,000 were exported, 70% being Szechuan silk.

These references to Customs statistics are made merely to show what trade is carried on, despite the tremendous difficulties of transport and the great distances from the sea, and are only from those places where the Maritime Customs have stations. Trade passing through other routes is not recorded, and there are no means of accurately ascertaining what it is, but the Customs reports are sufficient to show that railway communication would not only create a tremendous change in the economic state of the provinces concerned but would also benefit foreign trade immeasurably.

Having touched upon aspects of the question indicating the reasons why railways have not yet penetrated the mountain ringed provinces, and the reasons why communication by rail should be opened up, we will give some description of the various routes by which the Chinese Government are now prepared to undertake the construction of lines into Szechuan, Yunnan, and Kweichow. In this connection, too, we wish to draw attention to an article appearing on another page, in which, under the title of "The Railway Development of Western China," Mr. Arthur J. Moore-Bennett discusses the question. Mr. Moore-Bennett brings to his task a personal knowledge of the routes he refers to and is competent to criticise them. We content ourselves with dealing with the broad features for the general information of readers.

The routes by which the Chinese Government have made agreement to enter the western provinces are as follow:—

First, the Government has agreed to the extension of the Hankow-Szechuan railway, now being constructed from the Hukuang Railway Loan funds, from Kweichowfu to Chungking and Chengtu, the Capital of Szechuan.

Second, on December 18, 1913, the Government signed a preliminary agreement with Lord French, representing Messrs. Pauling and Company, of London, to construct a line on a percentage basis contract from a point opposite Shasi, on the Yangtze River, west of Hankow, to the south-west of Kweichow province, to join the projected line from Yunnanfu to the sea via Shingyi and Nanning.

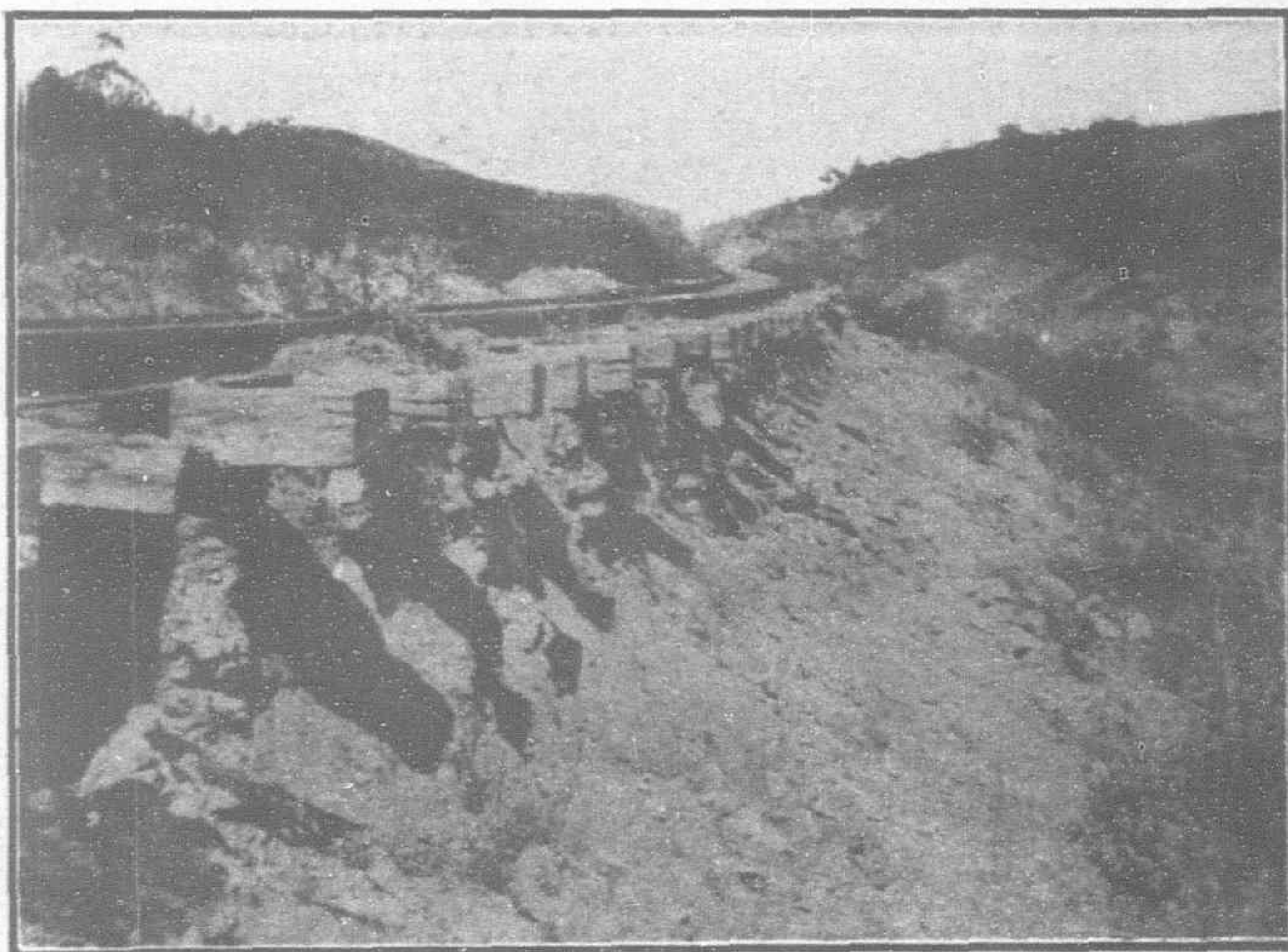
Third, on February 11, 1914, the Government signed an agreement with the Banque Industrielle de Chine, a Sino-French institution, for a loan to build a railway from Yamchow on the coast, west of Pakhoi, to Nanning, and Shingyi, to Yunnanfu, the capital of Yunnan province, and on to the Yangtze river at Suifu, and thence to Chungking, where it will connect with the line mentioned in the first paragraph.

Fourth, on August 4, 1913, the Government signed an agreement with Belgian representatives for the flotation of a loan to build a railway from Tatung, in the north of Shansi, through Taiyuanfu, to Tungkwan, the junction with the railway in course of construction from Lanchow to the sea, and accorded in that agreement the right to extend the line southwards to Chengtu the capital of Szechuan.

The fourth line is so far but a right of extension. It is not yet decided to build it, but the first three are to be built, and no doubt financiers will soon be active raising the necessary capital for the purpose. They will, when built, be sufficient to give the three provinces adequate railway communication with the other provinces of China and the outside world for many years to come. The following is merely information on, and not criticism of, the routes those lines will probably take.

From Hankow to Szechuan

It has been, of course the particular desire of politicians, financiers, engineers, and traders, interested in railways in China to construct a line which would, among other things, reduce the journey into the heart of Szechuan province from a strenuous and dangerous ordeal by way of the Yangtze River to one of comparative safety, comfort and speed by rail. The conflict between, and the subsequent adjustment of, British and French schemes having in view the object of building this railway were fully discussed in the January issue of the FAR EASTERN REVIEW, and it is not necessary again to deal with that aspect of the question. Suffice it to say that as a result of discussion of the particular interests of the British, Americans, Germans and French the financial representatives of those countries formed a Group to finance and construct what is known as the Hukuang railways, the term Hukuang being derived by the union of the two first characters of the provinces of Hu-peh, Hu-nan, and Kuang-tung, through which the lines to be built by the Group will run. This system comprises



Portion of the Szechuan Railway from Ichang built by the Chinese

(1) a line running south from Wuchang, opposite Hankow, to the southern border of Hunan, where it will connect with what is known as the Yuet-han railway—the Chinese line running from Canton northwards to the Hunan border—which is destined to form part of the trunk railway from Hankow; and

(2) a line westwards to Szechuan from Hankow, or the best available point in the vicinity.

In the original negotiations with the Chinese Government the arrangement was come to that Chinese capital should build whatever lines were needed in Szechuan province, the Quadruple Group terminating their system at Kweichow, just over the frontier of Szechuan, the proviso being clearly made, however, that if it was ultimately decided by the Chinese to use foreign capital the necessary amount would be accepted from the Group.

Content with this arrangement the members of the Group decided among themselves the division of engineering influence on the lines to be financed by them, setting aside the section from Wuchang to the Kwangtung border for the British, the section from Hankow, or vicinity, to Ichang for the Germans, and the section from Ichang to the Szechuan frontier for the Americans, the French standing out of this allotment in anticipation of obtaining their share in the ultimate extension to the capital of Szechuan, which, with considerable foresight, they located as the "sphere" most essential for the development of their plans for the domination of Szechuan and Yunnan provinces. To the various parties constituting the Group it was a foregone conclusion that the Chinese would never be able successfully to build a line through Szechuan, and their confidence in the belief that the Chinese would ultimately have to approach them for the capital if they wished to penetrate

Szechuan with a railway was not misplaced and has been justified by time. Having thus come to a satisfactory mutual arrangement among themselves they negotiated an agreement with the Chinese Government for a loan to construct the Hukuang railways, the document being signed on May 20, 1911. This authorised the Banks to issue a five per cent. gold loan for an amount of £6,000,000 to be devoted

(1) to the redemption of bonds to the value of Gold \$2,222,000 issued by the American China Development Company on behalf of the Imperial Chinese Government, and

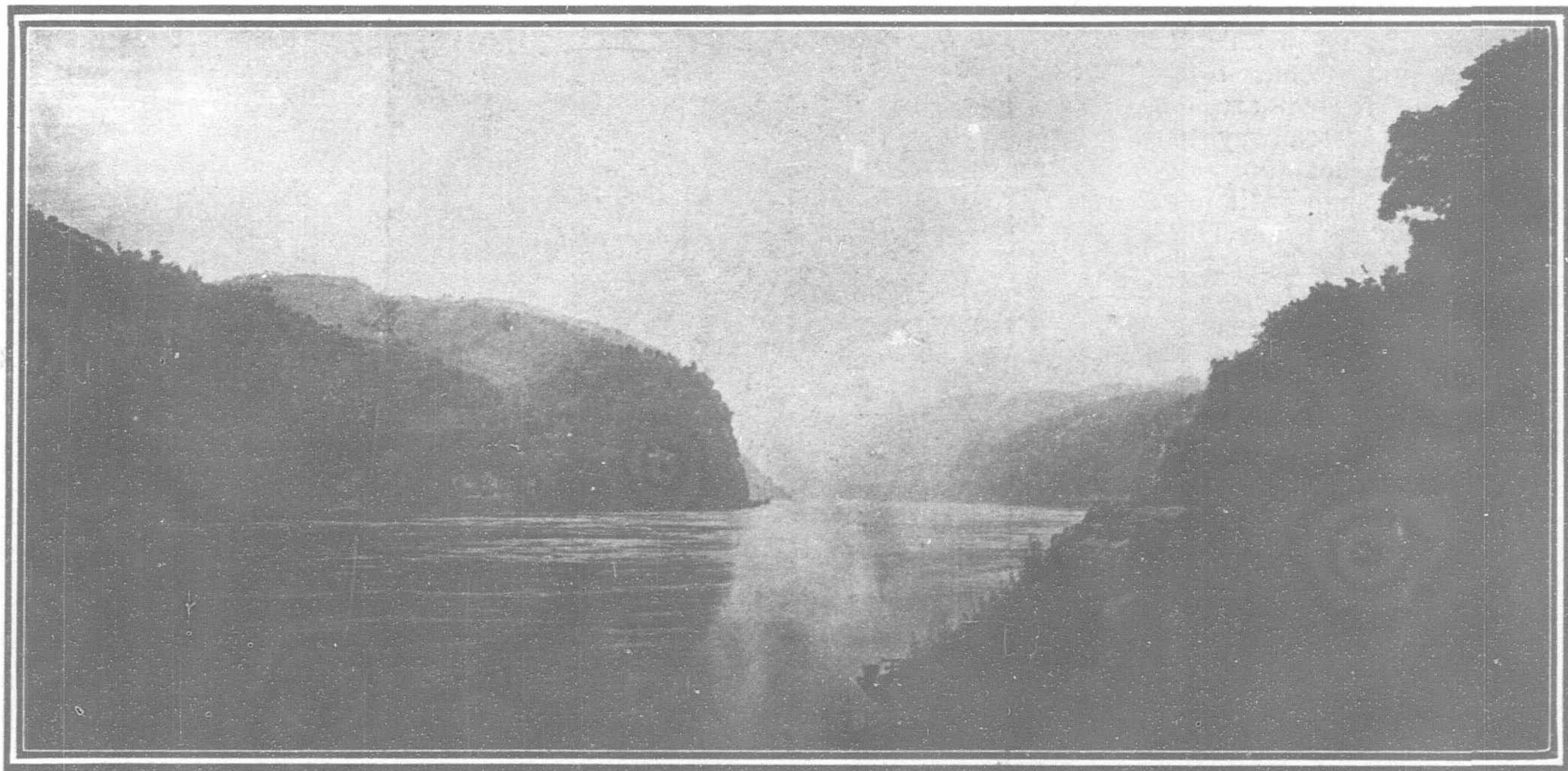
(2) the construction of a Government railway main line from Wuchang to the southern boundary of Hunan, connecting with the Kwangtung section, an estimated distance of 900 kilometres, and

(3) a similar line from a point at or near Kwangshui, connecting with the Hankow railway line and passing through Siangyang and Chingmenchow to Ichang, an estimated distance of 600 kilometres; and from Ichang to Kweichowfu, in the province of Szechuan, an estimated distance of 600 kilometres, the total length of this, "the Hupeh section of the Szechuan-Hankow railway line,"—and the one in which we are particularly interested in this article—being 900 kilometres.

Three days after the loan agreement was signed the representatives of the Banks concerned met in Paris and arranged,

of a tax upon land holders. A meeting of the Company—the Szechuan Railway Company—was held in November, 1909, when it was confessed that although the first sod had not been turned only Tls. 10,421,958 (about £1,357,000) remained in hand, the staff of the company on the books being 209, drawing some £8,500 per year in salaries and wages. This meeting, however, gave a fillip to the enterprise, and the first sod was turned on December 10, 1909, at Ichang, though a controversy had waxed furiously on the question of whether the section between Ichang and Wanhien or between Chungking and Chengtu should be commenced first. The Ichang supporters won the day; the first spike was driven at Ichang on July 21, 1910, and by October, 1911, when the revolution broke out, 16 miles of line had been built, while, preliminary work had been begun over sixty miles.

The work actually completed or in hand might be summarised thus: The bunding of the wharf was finished, three goods godowns were erected, earth work at the wharf and station were finished, a double track was laid from the wharf to the station, the Ichang station and four stations along the line were finished, two engine sheds for twelve locomotives, a water tower, and machine shop were finished, the head administration office, store department and staff quarters were finished, stone retaining walls and over fifty bridges were finished, two tunnels were



The Yangtze at Ichang

among other things, for the participation of the various parties in the event of the extension.

By this arrangement the French now control the section from the Capital of Szechuan to the end of their allotted distance, for, as mentioned in our last issue, the Chinese Government have now agreed to the extension of the line through Chungking to Chengtu, and the Groups are making arrangements to have the necessary finances raised. In all, the distance from Hankow to Chengtu via Chungking will be somewhere in the vicinity of 1,100 miles, the whole Hukuang system amounting to about 1,700 miles, and that, in short, is to be divided as equally as possible between the four nations composing the Group, both as regards engineers, purchasing commission and profits from flotation of the loans.

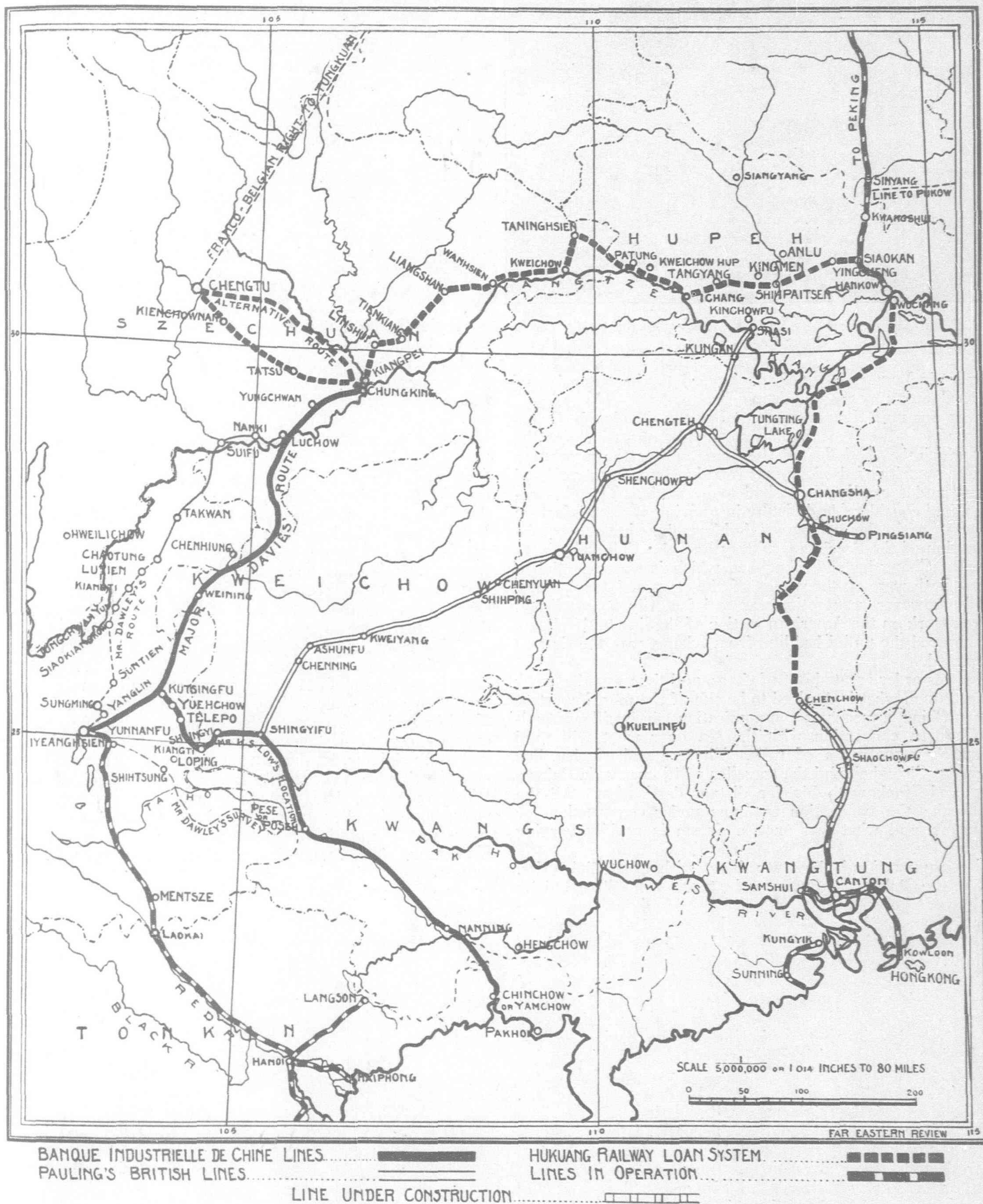
Before the Chinese Government had come to an agreement with the Quadruple Group to finance the line from Hankow to the eastern edge of Szechuan, Chinese merchants had made an attempt to connect Ichang and Chengtu, a semi-official company having been formed for the purpose by Viceroy Hsi Liang, in 1904, to prevent a foreign loan being negotiated. A sum of Tls. 15,405,902 (about £2,000,000) had been collected in shares and taxation, but only about 28 per cent. had been subscribed voluntarily, the balance having been obtained by forced levy

completed, while over sixty bridges, and several tunnels were started. Altogether 15,000 coolies were at work, and construction was going ahead when the effort of the then Minister of Communications to bring about the nationalisation* of railways ended in the turmoil which precipitated the revolution.

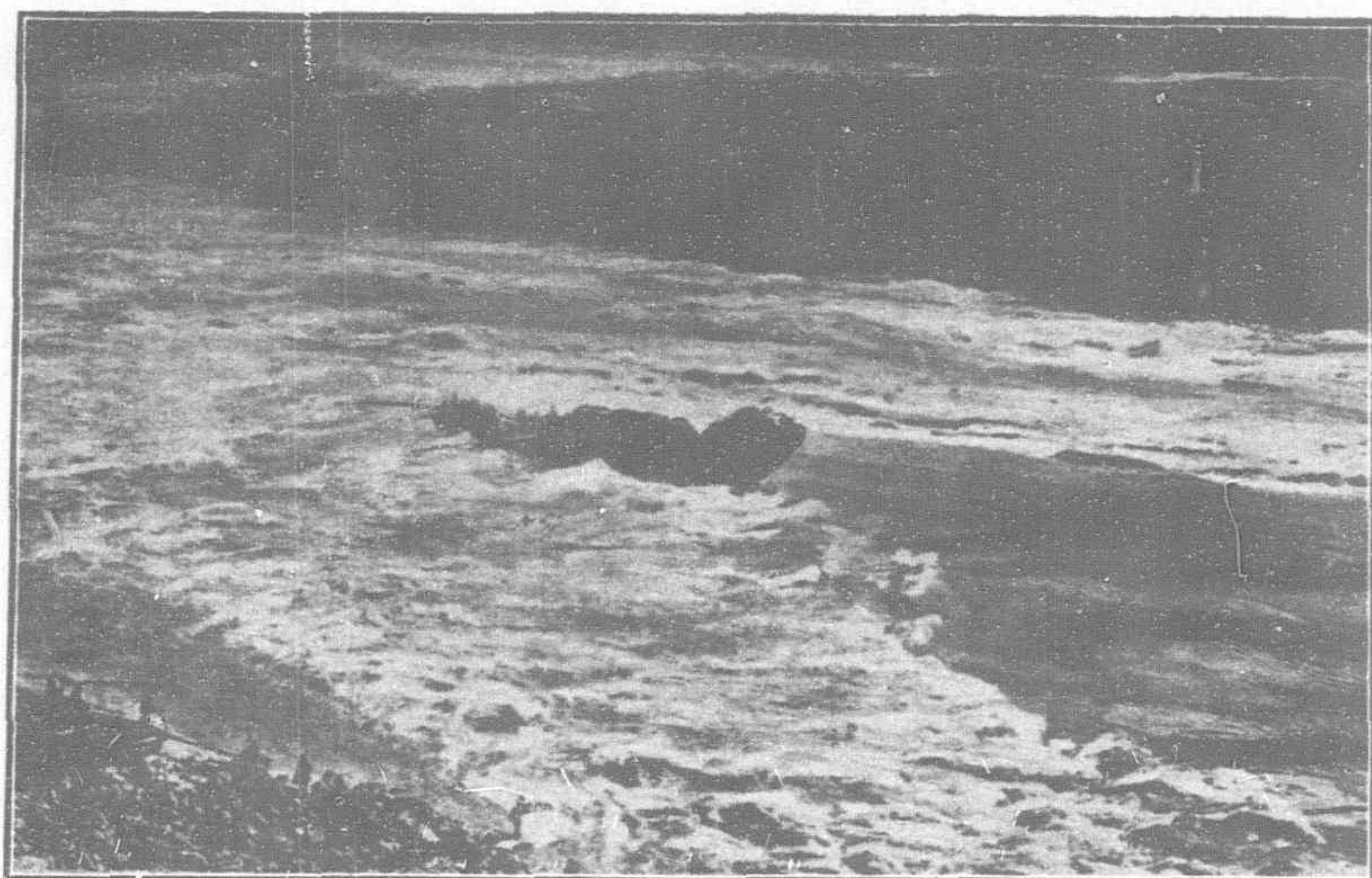
Work ceased completely, and the rolling stock of three Baldwin shunting engines, one first class private car, two second class passenger cars, four third class passenger cars, fifty high side freight cars, thirty steel ballast cars, and twenty flat cars stood over as a legacy for those who would ultimately take up the work, and the line which had been built rapidly began to deteriorate. An eventual examination into the affairs of the company disclosed many scandals, among the worst being the disastrous employment of funds to purchase shares in wild-cat rubber companies. This was the inglorious end of the attempt of the Chinese to build and control their own railways in Szechuan, and it was the death knell of the old policy of preserving the province from the encroachment of foreign finance and politics through the medium of railways. The Government would not permit, even if a wish for it had been expressed, any further private control of what must eventually be an important trunk line, and although there was great reluctance to do so the

*See Revolution Number of the FAR EASTERN REVIEW, April, 1912.

NEW RAILWAYS IN WESTERN CHINA



The black line running from Chinchow or Yamchow, on the coast through Nanning to Kutsingfu, and from Yunnan to Chungking shows the approximate route of the railway granted to the Banque Industrielle de Chine to capitalise by a loan. The Hukuang system now in course of construction is distinctly shown. The British section is from Yichang, near Chenchow, on the Kwangtung border to Wuchang; the German section is from the Peking-Hankow railway to Ichang; the American section is from Ichang to Kweichow, and the French section is from Kweichow to Chengtu. The Yuet-han Railway Company is building the southern section between Canton and the frontier at Yichang, but there is an effort being made to secure the rights of the company for the Hukuang Loan Group, or in other words to have the section nationalised and redeemed with a loan by the Group.



A 50 ton cargo junk descending the Glorious Dragon Rapid, Upper Yangtze

Government in January, 1914, finally agreed to the extension of the line to Chengtu by the Quadruple Group.

It was not until January, 1913, that the Quadruple Group felt disposed to advance money to commence operations on the lines for which they had floated the loan. After the revolution the original security of the loan was found to have been rendered inadequate and a readjustment had to be made. The Government, too, had considerable difficulty in arriving at a satisfactory arrangement with the companies holding the rights over the Ichang section of the Szechuan railway and the Chinese private line between Changsha and Chuchow, which it was essential to redeem, as both were on the routes of the proposed trunk lines. Eventually, however, resumption was satisfactorily accomplished and survey work on the American section of the line to Szechuan, which embraced the unfinished line from Ichang, was the first to be commenced.

Thus was order created out of chaos, and thus was the work commenced upon what is destined to be one of the most important railways in China, a means of communication which will eventually give Chengtu connection with the sea over what will total approximately 1,700 miles of rails. The sea end of that line commences at Shanghai, and the traveller will journey via Pukow, Sinyang, and Hankow to his far distant destination. All the lines to make the connection are now under construction, or under survey, and what was once a dream is rapidly verging upon the reality.

The consummation is, however, beset with great difficulties. To connect the Pukow station, now in touch with Shanghai by rail, with the Peking-Hankow railway above Hankow is easy; to push to the west of Hankow is a heavy task. When the agreement was made it was the wish of the Chinese to start from the Peking-Hankow railway at Kwangshui and touch at Siangyangfu, then striking south to Ichang, but the great increase of haulage makes that route undesirable for a trunk line. As the low-lying nature of the country between Hankow and Ichang renders railway building almost impossible the engineers have surveyed other routes, and it is now recommended that the line shall branch off from the Peking-Hankow some eighty kilometres to the north—about Siaokan—and then take almost a direct line, taking advantage of the higher ground that is available along this route. There is a likelihood that the selected line will pass Yingchen, and go straight across to Tangyang and then to Ichang, but the trade route from Siaokan goes northwestwards to Anlu and then goes south-westwards to Kingmen, Tangyang and Ichang. However, the problem for the engineers is to select the route which it is safest to build and straightest, and they are now engaged endeavoring to find a solution. The Engineer-in-chief of the German section recommends that a complete survey be made before deciding to build owing to the high cost. He wishes to have the Siangyangpu branch built. Ichang, is 1,000 miles from Shanghai by river. It is important only by virtue of its position below the gorges of the Yangtze, and figures mostly as a centre for the transhipment of cargo. All merchandise upward bound to Szechuan and Yunnan is transhipped from the steamers

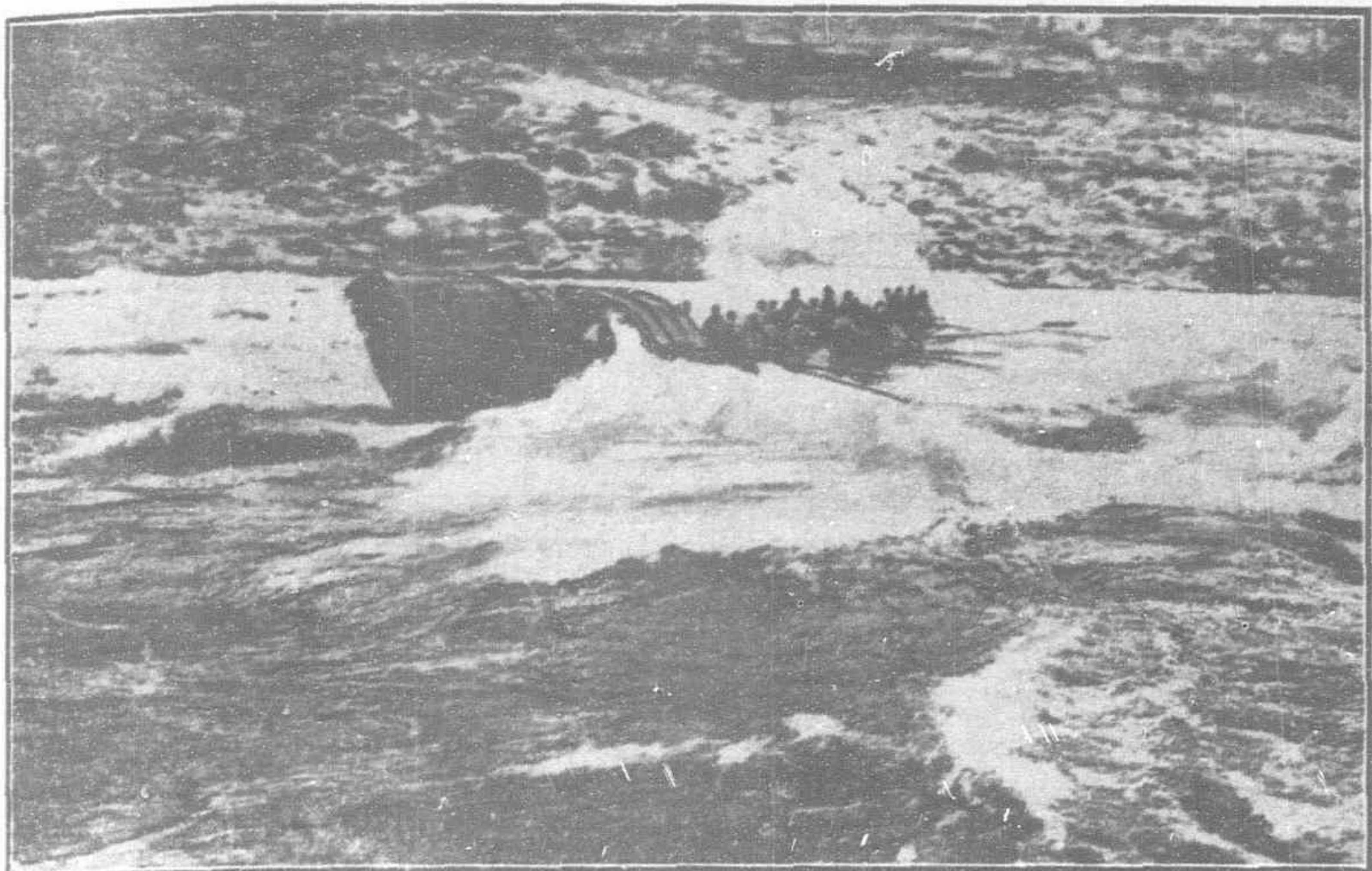
here and mostly placed on junks of from 25 to 40 tons burden, which are tracked laboriously through the gorges by gangs of coolies, often numbering 100 to a junk, and taking as long as three months in bad states of the river to cover the 400 miles to Chungking, while at some periods navigation is not possible at all. In addition to the junks, however, steamers have now been built to stem the rapids and despite the tremendous dangers manage to maintain a more or less regular service. At present one new boat is in course of construction for this purpose, and one is in operation, the "Shutung," commanded by Captain Plant, the pioneer navigator of the Upper Yangtze. It is estimated that 10 per cent. of the junks which traffic through the gorges are lost, and with them go down whatever cargo they are carrying. The railway, when it is built, is bound to secure the whole of the trade now compelled to pass up and down through the gorges, and that was the prime inducement which influenced the Chinese to commence construction from Ichang.

While much earthwork, bridging and tunnelling was done by the Szechuan Railway Company the American engineers now surveying in the region believe that by going about 10 miles inland from the river they will be able to secure a route much shorter and of easier grade. The Chinese line followed the river to a greater or less extent and between Ichang and Wanhsien, about 140 miles, fifteen miles of tunnels, to say nothing of the heavy cutting and bridging, would have been necessary. Beyond the town of Hsiangchi there is a succession of precipitous mountains and lofty passes, the lowest of which is 800 feet and the highest 4,000 feet, and thence to Wanhsien the mountains stretch down to the Yangtze like the teeth of a comb, the cost estimated by the Chinese to overcome these difficulties being Taels 38,500 a li (about one-third of a mile). The tunnels found to be necessary not far from Ichang were bored, while work was started on two some fifty miles out, one being 6,200 feet long and another 1,000 feet long. Altogether two tunnels were completed and eight others were started, 1,500 feet of the long tunnel having been driven when work ceased.

The river as far as Wanhsien skirts between the edge of mountainous country, split in every direction by gorges and chasms, vertical cliffs of coarse conglomerate towering a thousand feet above the water. The eighty miles between Ichang and Kweichow is, of course, the great gorge region, the rapids commencing 15 miles above Ichang. The hills generally lay north and south right across the route of a railway. Above Wushan, just over the Szechuan border, the mountains recede a little, but at the Windbox gorge, the furthest upstream, and perhaps the most picturesque, the cliffs are not inferior to those below, but the hills again recede and the river opens out into a broad reach at Kweichow. The mountains then run in a north-easterly and south-westerly direction being of peculiar formation and broken by cross ranges, with coal and iron seams visible in many places.



Salt Junks at Tsungyang Custom House, Kweichow, Szechuan



A cargo junk descending the Tchín Tan Rapid, Upper Yangtsze

Mr. Randolph, the acting Engineer-in-chief for the American section, endeavored to discover a route calculated to escape the difficulties presented on the Chinese location and eventually succeeded in doing so, finding at the same time a much shorter line, though the work to be done on his route will still be heavy. Between Ichang and Nantu there will be about 22,000 feet of tunnelling to say nothing of the bridging and the almost continuous cutting, and between Nantu and Kweichow in Hupeh the tunnelling will amount to between 12,000 and 15,000 feet, while the bridging will be much less than on the preceding section. The survey of the first section was to have been concluded in January, and if the report is favorable the route upon which the Chinese engineers worked will be abandoned.

Probably the Ichang-Kweichow section of this line is more difficult than what succeeds, but the two hundred and more miles to Chungking will give the engineers ample scope for displays of talent and ingenuity in overcoming the problems which nature has managed to set in her effort to isolate this rich province from the outer world. The existing road between Kweichow in Hupeh province to Kweichowfu in Szechuan, follows the river to Patung-hsien, and then branches north-west over passes reaching 5,500 feet at Tachang, 3,300 at Tanninghsien, till it is about 30 miles from the Yangtsze and then turning at right angles goes almost due south to Yun-Yanghsien (1,000 feet), at the junction of the Wantungho, an affluent, with the Yangtsze. It then follows the river for about 30 miles to Wanhsien (600 feet), and leaves the river, which comes from a south-westerly direction, going nearly due west at an elevation from 1,000 to 3,400 feet to Liangshanhsien (1,650 feet.) The road, which runs through innumerable villages and some cities, keeps about 40 miles from the river, the elevation dropping between Liangshanhsien and Tienkianghsien (1,350 feet.) For thirty miles it goes due west to Linshuihsien (1,170 feet), and drops due south to Kiangpeiting—on the opposite bank of the river from Chungking. The elevation from Linshuihsien to Chungking is about the same 1,170 to 1,600 feet, and sloping near the river to 750 feet. Chungking is the first objective of the line, for it is the largest commercial city in the

province and is the port where all the commerce concentrates. All the trade from the Chengtu plain and from along the Yangtsze and its feeders to the south-west come to Chungking. The city is splendidly situated, on a spit of land at the junction of the Kialing-ho with the Yangtsze, for waterborne traffic, but the Kialing river makes a bridge of some importance necessary to bring the railway to its portals. As the line from Yunnan is to come from the west the river has to be bridged, so Chungking gains by that especially as there is a possibility of a line to Chengtu being continued on from Linshuihsien, 60 miles before Chungking is reached.

The construction of a railway along the 299 miles between Chungking and Chengtu, though the country is more or less mountainous until the Chengtu plain is reached, offers no extremely grave difficulties. Soon after leaving Chungking a region is entered which is well supplied with waterways and canals which may affect freight possibilities. The main road between the two cities is described as one of the best in China, being paved with stone slabs, and is a constant avenue of traffic. In what is called the Red Basin is one of the richest regions in the whole world, and perhaps the most densely populated, for its 70,000 or 80,000 square miles carry 50,000,000 people intelligent, industrious, thrifty and commercially progressive, any railway between any two cities should pay. Every valley is under intense agriculture, hillsides are terraced and cultivated to the summits; throughout the length and breadth of it—an area almost that of Belgium—there is not a road which would carry an ordinary wheeled carriage or wagon; the wheelbarrow is the only wheeled vehicle used, and as Colonel Manifold says, "in these days of severe industrial competition it seems almost incredible that a country with this enormous population and natural advantages should be allowed to remain without a railway when even the local traffic from town to town would have been sufficient to make one pay."

The system of irrigation on this plain, which enables it to support its 50,000,000, is remarkable, and earned for Li Ping, the Chinese engineer who created it, the rank of "first gentleman," and secured for him the erection of commemorative temples throughout the length and breadth of the land. Crops grow one after the other with amazing rapidity, says Mr. R. Logan Jack, and, as many as seven successive harvests can be



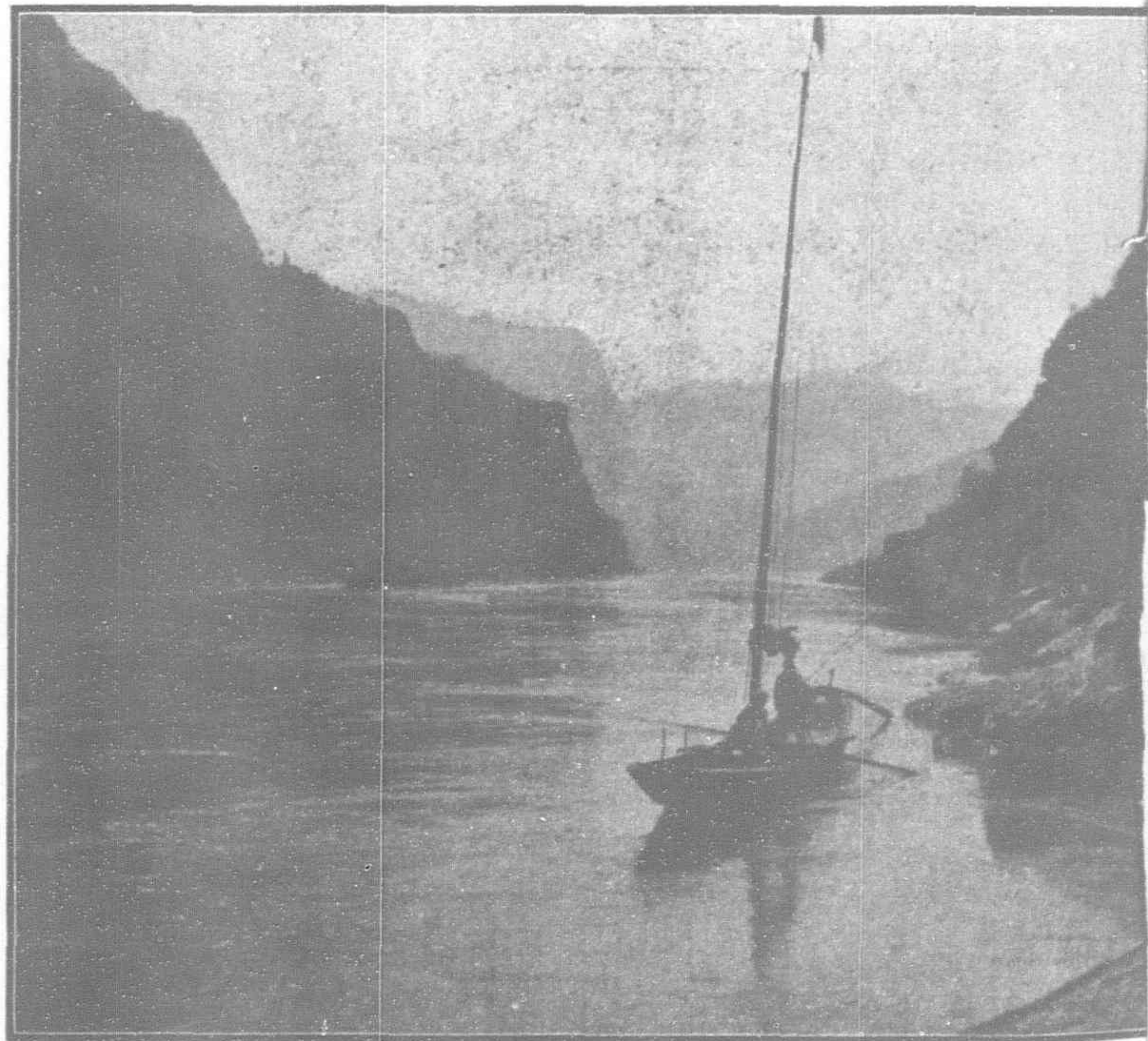
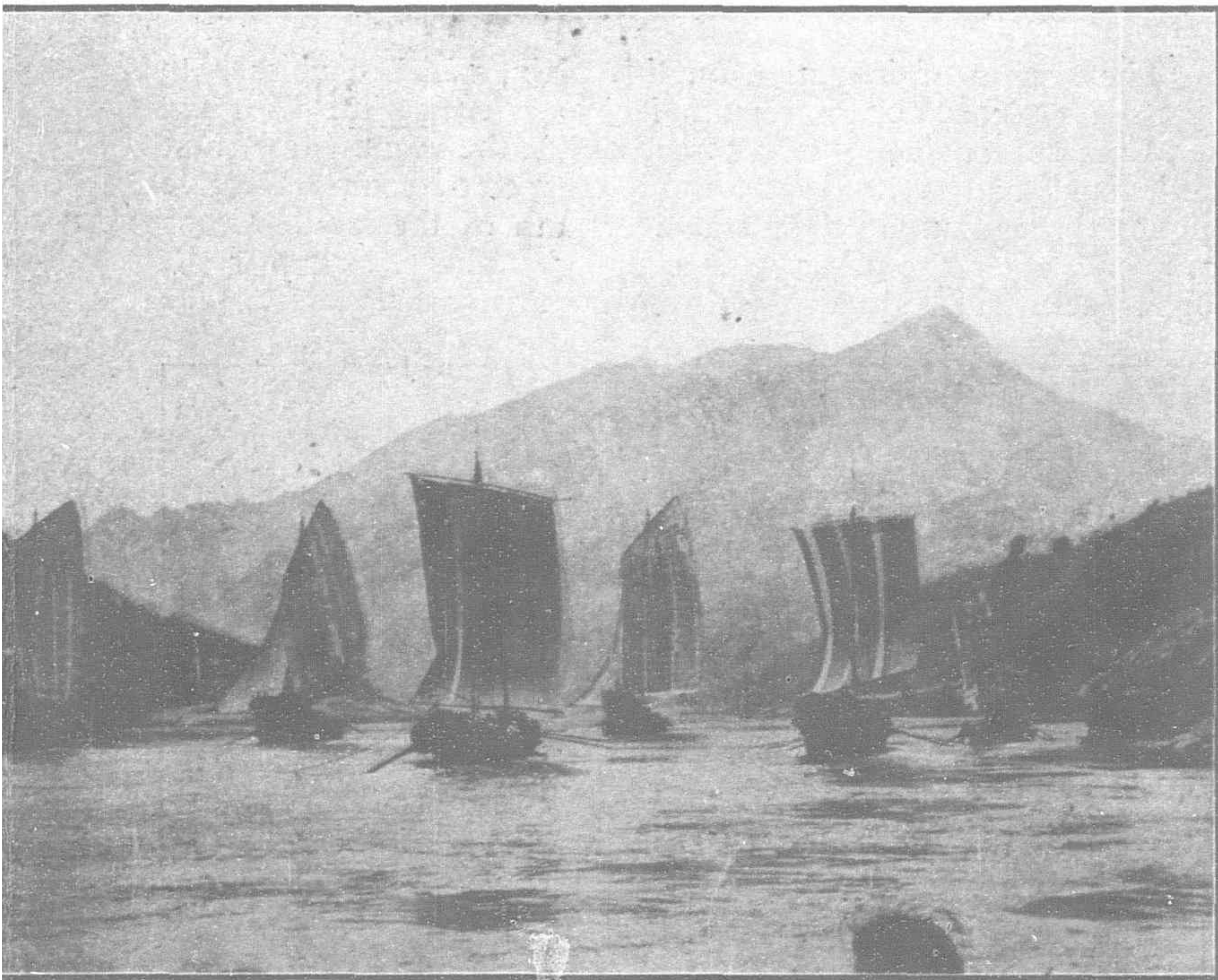
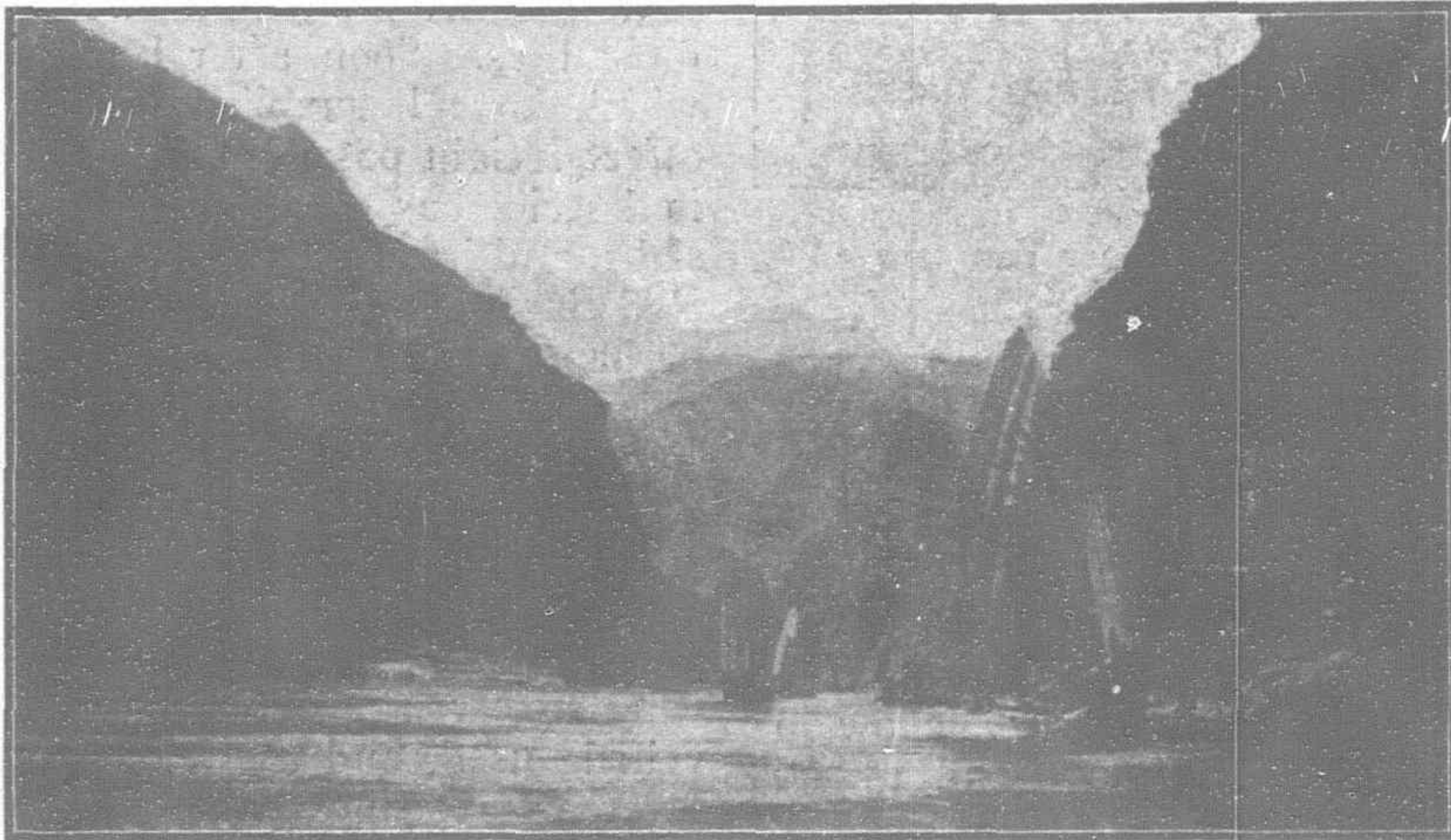
A Rope Suspension Bridge, near Kweichowfu, Szechuan.

made in the course of a year. All manner of fruits and cereals grow in abundance, and the fields which were once blooming with poppy for opium production now are covered with waving wheat. Peaches, apricots, plums, oranges, lemons, pears, apples, mulberries, persimmons, cabbages, lettuces, kale, turnips, endives, carrots, cucumbers, melons, peas, beans, pumpkins, millet, barley, rape, maize, oats, buckwheat, wheat, and sugarcane are among the products. Water for irrigation is lifted from the natural and artificial streams by chain-pumps or huge bamboo waterwheels, and bridges of quaint and picturesque appearance abound on all sides, the natives appearing to have "anticipated most of the finest conceptions of modern engineering;" bridges are camel backed, hog backed, level decked, and arched in all sorts of styles, and made of wood and stone. Industrially the natives are strenuous laborers, mining coal, copper, zinc and other ores with primitive methods. The chief industry is that connected with the preparation of salt*; great brine deposits are situated about the centre of the Red Basin, but in the east and other parts of the province wells are also worked. At Tzu-liu-ching natural gas is used for boiling the brine, while coal is the fuel in other places. The wells from which the natural gas emanates have never been

set down by Richtofen at 800,000, while the Chinese claim 1,000,000. The streets are broad, paved, and lined with rich shops, stocked with silks, furs, silver ware, etc. A big commerce is done in the city, which can be reached by large boats from the Min river during six months of the year, and smaller ones during the remaining months. Once a railway reaches Chengtu it will not be long before lines are run out to the surrounding regions to tap the large and important producing centres that exist on all sides.

If the road direct from Chungking is taken to Chengtu for the railway there is a choice of two routes fifteen miles from Chungking, the shortest one going direct to the capital through Pishanhsien (1,150 feet), Tatsu-hsien (2,500 feet), Anyohsien (1,170 feet), Lochihhsien (1,640 feet) and Kienchownan (1,330 feet).

Colonel Manifold in reporting on the result of his investigations with the object of establishing railway communication states that "unless this planet were to stand still this naturally rich province must advance with the rest of the world. But Szechuan must first be opened up from the east and the increased prosperity which rapid and safe means of communication will bring to this province will cause new outlets to be sought and



Typical views on the Yangtze

Photos by Capt. T. C. Fitzhugh, M. V. G.

worked for petroleum, but, in the words of Sir Alexander Hosie, "the stench which permeates the whole town reminds one forcibly of a gasworks." In the future these wells may yet be of great account in the world's oil supply.

The plain immediately about Chengtu, some 70 miles in length by 30 in width, is naturally of great wealth and prosperity, and contains many populous cities, the great highway leading to the capital from Pengshanhsien, on the Min river, being, for a distance of forty miles, "like one long street lined with houses."

Chengtu itself is a splendid city, encircled by walls 30 to 40 feet high, and about 12 miles in circumference with a population

these will be in the direction of Yunnan. The importance of this line from the lower Yangtze rests not only upon its being a sound undertaking financially, but also on the fact that it will become the centre from which will radiate the great system of railways stretching from the Indian Ocean to the North China seas."

From Lamchow, on the South Coast, to Yunnanfu

The most important railway which is projected for construction into Yunnan is the one for which the rights have been given to the new Banque Industrielle de Chine. It is to run from the little known port of Yamchow, west of Pakhoi, to Nanning, then through the Yu-kiang valley to Yunnanfu, and onwards into

*In the FAR EASTERN REVIEW of December 1912 a full description of China's salt deposits and a history of the Salt Gabelle was given, including Sir Alexander Hosie's reports on the Szechuan wells.

Szechuan, Chungking being the terminus, an approximate distance of 1,200 miles.

The route up the valley of the West River has always been the natural one into Yunnan for all south-China trade, and many different officials and merchants have from time to time urged the building of a railway at least from the head of navigation at Poseh across the mountains to the Capital of Yunnan. In 1899 a Chinese named Tang-kiao worked up an agitation with this object in view, his arguments for a railway being stressed by the building of the French line from Tonkin to Yunnanfu. Tangkiao, in a petition to the Viceroy, set forth the claims of the his proposed line, both from a strategical and commercial point of view, so strongly that he was able to stir up action. He insisted that the line was a necessity since the French railway was pushing north from Tonkin, and the British were talking of a railway from Burma. "What we need," he wrote, "is a line which will be of commercial use and enable us to defeat the French." A line from Yunnan to Poseh and on to Nanning, in particular, would enable the Chinese, he said, to secure the traffic from Yunnan; would develop the rich mineral resources; would expand and cement close relations with China's most commercial province, Kwangtung, and would, in the event of a war with France, permit of the rapid movement of troops to Yunnan, Kwangsi and Kweichow. As a result of this agitation the Ministry of Communications in 1911 sent Mr. K. S. Low, one of their best engineers, to survey the line from Poseh to Yunnan, and to communicate his report to the Viceroy. His instructions were to avoid branching from the French railway, and the line he located to comply with that order is described later. The revolution prevented anything



SCALE 1/1,000,000

0 5 10 20 30 40 50 Km.

ORIGINAL SURVEY

PRESENT ROUTE OF RAILWAY

FRENCH RAILWAY INTO YUNNAN FROM TONKIN

tangible springing from the scheme so far as the Chinese gentry and merchants were concerned. They could not raise the funds; so the matter was, in May, 1912, again brought to the attention of President Yuan Shih-kai, who replied to the Yunnan Tutuh that he had not overlooked the importance of the project and that he had instructed the Ministry of Communications to study the question and furnish him with a report. The Tutuh of Kwangtung also brought the matter up, and, later, the Ministry of Communications despatched two Chinese engineers to make a report to supplement that of Mr. K. S. Low, the President notifying the Yunnan Tutuh that as soon as these engineers made their report he would publish the regulations for a Chinese Company to carry out the work. The President also urged the Tutuh to see that the Tutuhs of Kwangtung, Kwangsi, and Kweichow, in conjunction with Yunnan, could have the necessary capital raised, adding that the Central Government would supervise the enterprise. The two engineers were despatched in due course, and arrived at Yunnanfu in the summer, where they worked with Mr. W. S. Dawley, who had been engaged by and was surveying for the Yunnan Railway Company, which had subsequently dissolved. The Tutuh displayed a keen interest in the work, and the Yunnan Railway Bureau was organized. The appointment of Dr. Sun Yat-sen to undertake the construction of future railways rather embarrassed the Bureau, but in 1912 it advised the Tutuh to proceed with the building of the line, a matter which was later on referred to Dr. Sun. The Tutuh replied to the Bureau on the strength of advice that the line to the Kokiut tin mines from Mengtsze should first be built, but the Bureau responded that, if it were desired to build but a short section of railway, a line should be run from Yunnanfu to Yanglin, which would later serve as the base of a line to Poseh and one to the Yangtsze, the proceeds from the former being probably sufficient eventually to enable the Yunnan-Szechuan line to be built by the Chinese. The small line to the tin mines would, the Bureau argued, be but a feeder to the French railway, and that they did not desire to construct since the building of that line would be working for the benefit of French interests.

For the reason that sufficient capital could not be raised this scheme fell through, and the next heard was that the Tutuh of Yunnan was negotiating with a German firm to have the line built. The French at once became active, for they had certain claims, and the German hopes—if there ever were any—were blighted, for the French Minister in Peking rightly became alert in support of his nationals and managed to have two birds killed with one stone. He secured the line from Yamchow to Yunnanfu and from Yunnanfu to Chungking.

Most talk of the former proposal has centered round a termination at Pakhoi, and it came as a surprise to the public when it was announced that Yamchow had been selected. But there were good reasons. Yamchow has a natural harbor, said to be deep enough to float sea-going vessels, and has the additional advantage of being sheltered by hills from the typhoons which occasionally sweep over this region. It will have to receive some attention to make it fit for a port, but that is said to be an easy matter. The northern pronunciation of the name of this town is Chin-chow, and on some maps that rendering is given instead of the southern one of Yamchow. In the Ching dynasty the military Taotai of the territory resided there; and the locality used to be famous for the four hills of Anking, Chutze, Chungjen and Shihwan which are near by. Two rivers debouch in the harbor, flowing past two sides of the city, and they bring down a certain amount of trade, articles exported being sugar, indigo, tobacco, rice, medicines, pearl-shell, coral, silver, gold, and coal. The mountains offer no distinct difficulties to railway construction, and the route of the

projected railway will probably follow the trading road to Nanning, which city is entered over plain lands, the valleys en route, being cultivated.

Since Nanning superseded Kweilin as the Capital city of Kwangsi province it has increased in importance. Its situation on the West River (or Sikiang) just below where it branches to the south-west towards Lunchow in Tonkin, and north-west to Yunnan, is advantageous to it as a distributing centre. It is on the north side of the river, and if a route is located for the railway on the southern bank there is a likelihood that it might be found expedient not to connect directly with the city since the river is wide at the place and bridging might not be worth the while. Nanning is a walled city and was declared open to foreign trade in January, 1907. Its growing importance can be gauged from the fact that in 1912 the total value of the trade passing through the Customs Office was Hk. Tls. 7,033,825, an increase of about 30 per cent. above the highest figure on record. Exports as well as imports showed enhanced progress. The principal exports were beans, canes, dried lizards, medicines, brown and white sugar, ground-nut cake, paper and aniseed. The bulk of the carrying trade is now done by motor boats. The journey from Wuchow to Nanning by boat occupies about twenty days, but the motor boats make the round trip between Wuchow and Nanning in six days.

The character of the country on the West River alters about Nanning, the hills giving way to plain close by the city, but cultivation is not generally so heavy as the river is ascended as might be supposed. In this regard, Mr. Archibald R. Colquhoun, writing in 1883, says "To arm-chair projectors, who, studying some imperfect map of China at home, may fancy that alongside this waterway of the West River there must exist a teeming population living on enormous cultivated plains on its banks, it is the duty of the truth seeking and truth-telling traveller to dispel the illusion. The province of Kwangsi, compared with other provinces of China, is mountainous, bare, and barren, thinly peopled and with only a small area which is cultivable—this being where the river bank here and there spreads out into small plains; and these become fewer as one travels westwards. Surprisingly small as the amount of cultivable land is in this huge



Mr. K. S. Low (Low Kuo-sui)

province, which (like Kwangtung the neighboring province) is of about the area, roughly speaking, of Great Britain, the thinness of the population is all the more remarkable. All the land which is culturable is by no means under cultivation—as is the general impression in regard to China—and this shows the paucity of population relatively to the enormous area of the province." Mr. Colquhoun writes, of course, with his voyage from Canton in his mind, and what he says shows the wisdom of the Chinese in wishing to cut down from Nanning to the best port near at hand rather than prolonging the railway in competition with the river right through to Canton as used to be urged. It is, of course, logical for the Chinese to wish to have their own port to compete with Haiphong, and it is wise for them to shorten the railway journey from Yunnan to the sea if they hope to develop a large freight traffic, as no doubt they do. No better port than Yamchow is available. Although Pakhoi has long been an "open port," it has not the harborage facilities. It is an open roadstead, at which steamers are compelled to lie a mile from the beach, and all cargo handling has to be done with lighters and junks, which often cannot, owing to the state of the weather, carry on the loading. Yamchow, it is hoped, will overcome these disadvantages, but it will not destroy the trade of Pakhoi. Certainly the railway, if built, will derive more advantages from having its seaport at Yamchow than at Canton, as has been urged, and if the

coal in the vicinity develops necessary qualities for manufacturing purposes who is to say that Yamchow will not yet spring into an important industrial centre where the minerals of the hinterland might be transformed into useful materials for shipment to other parts of China and abroad?

All the regions which a line from Yamchow to Yunnan and Szechuan will tap are rich in minerals, as has been said before, and, as has been shown, the chief reason for neglect properly to mine them is the lack of transportation. The only means of transporting products from Yunnan by the West River route is to have them carried on pack mules or coolies' backs over long distances, and then float them down stream to Nanning in small boats. The traffic is attended by so many difficulties that it is impossible for it to develop as it should until a railway is constructed. Already, however, there is a steady trade in the staples already mentioned, which are brought down from the country to be shipped from Nanning to Canton by the West River. The head of navigation on this river is Poseh and any railway to Yunnan must pass through the valley of the Yuh-liang to this port. The country alternates between mountains and low lying plains the ascent being gradual but not anywhere near as difficult as the passage up the valley of the Yangtze into Szechuan. Open country obtains for a short distance from Nanning and gives way to low, bare undulating country dotted with small villages, and later the river runs through walls of lime-stone with queerly serrated ranges in the near and far distance, now rushing through grim narrow gorges, again breaking into "a splendid vista of champagne country, undulating and verdant, lying on either side of a long straight reach." Above Hangan the limestone ranges press closer to the river, their picturesqueness being attractive to the tourist, but their formation disconcerting to the engineer. West of Shung Lamhu, however, these grotesquely shaped mountains disappear and fields of corn dip to the river's edge, the country being cultivated for extensive areas, the hills in the back ground rolling, away in easy undulations. Practically to Poseh where red sandstone bluffs touch the river, the country is cultivated, the level to the serrated hills being broken by rounded knolls, villages being noticeable at varied intervals.

Poseh is the trading centre for Yunnan and Kweichow so far as southern China is concerned. It is situated at the junction of an affluent with the main river and is built on rising ground. It always maintains a busy air, the junk and sampan fleets generally being large, while the overland trade combined with the tile and pottery works in the vicinity give it a thriving and busy appearance.

From Nanning to Poseh no actual survey has yet been made, but a rough estimate of cost was prepared two years ago by Mr. K. S. Low at the instance of the authorities. He advocated that no railway be built between Nanning and Canton, but between Nanning and Hengchow, and thence south to Pakhoi, the only port on the coast in general use. Between Poseh and Nanning Mr. Low estimated the 150 miles of country to be two-thirds level and one-third hilly, the cost of constructing a line over which would be Taels 75,000 per mile on the level country, and Taels 100,000 on the hilly, or, for the whole length, about Taels 12,500,000. His total estimate for the line between Nanning, Hengchow and Pakhoi was about Taels 11,500,000.

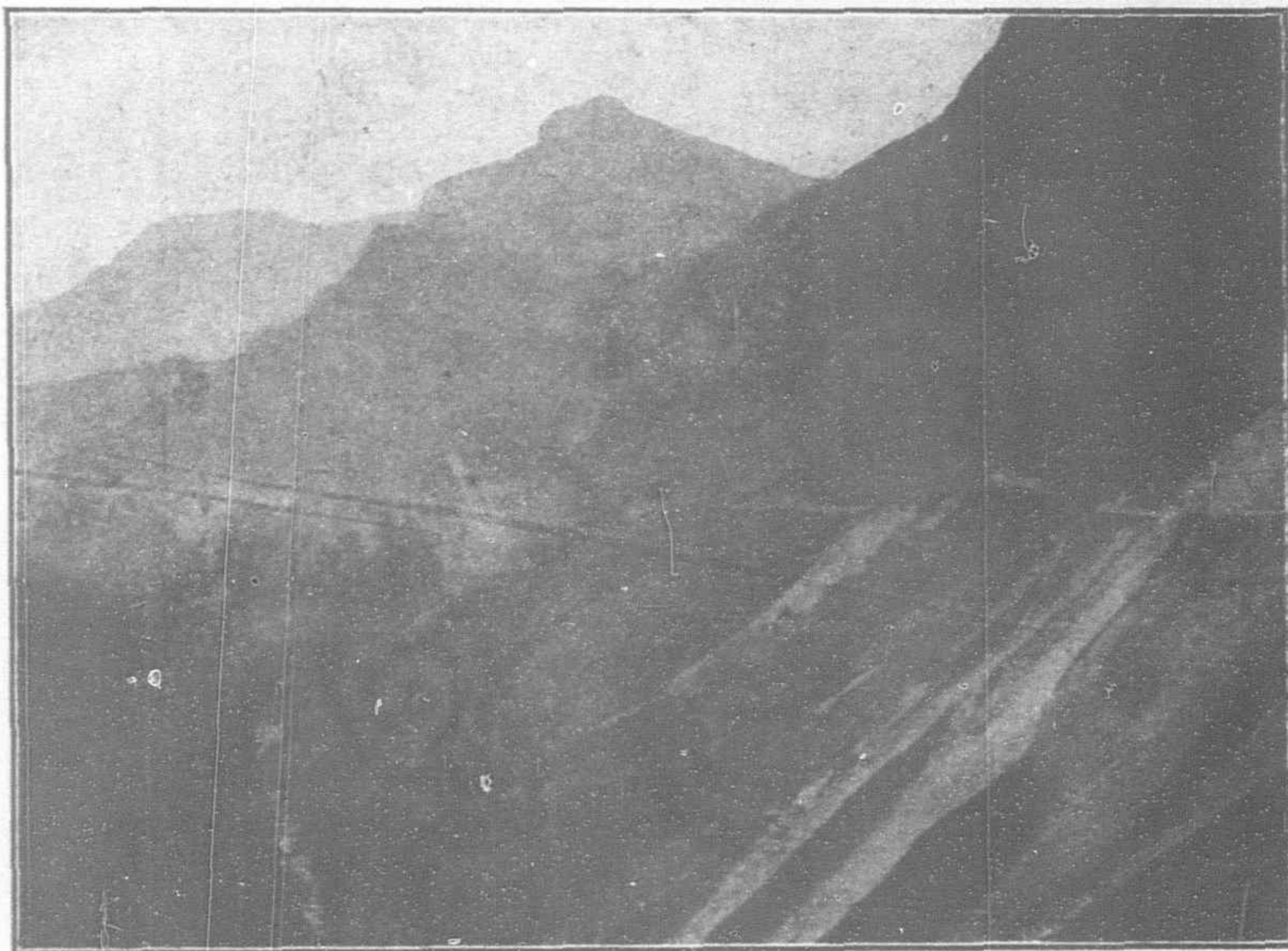
From Poseh to Yunnanfu an instrumental survey was made by Mr. Low, and a reconnaissance over two routes was carried out by Messrs. W. S. Dawley and Arthur J. Moore-Bennett.

Near Poseh the country along the river is flat and highly cultivated, but three miles away precipitous cliffs abound, rising up to 200 feet above the river with the strata dipping ten degrees to the horizontal. Hills later slope down to the water's edge and continue so, being covered with timber and bamboo groves.

The city of Yunnanfu is surrounded by a fine brick wall, 30 feet high and measuring about $4\frac{1}{2}$ miles round. As is generally the case, a very large part of the population live in the suburbs, which extend to a considerable distance round three sides of the city. Yunnanfu stands at a height of 6,700 feet and its climate is never hot, 85° in the shade being about the maximum summer temperature. Although there are frosts in winter no very severe weather is ever experienced. The population is estimated to be 80,000. Yunnanfu can boast of a new modern gaol; a Government medical school and an up-to-date arsenal.

Mr. Low commenced his survey in the spring of 1910, fixing the elevation of Poseh, at 1,000 feet above the sea level. Except for the divide between the West and Red Rivers easy grades were found along the course of the river over the western corner of Kwangsi province. The country passed through was thinly populated and not very productive, the population being chiefly of the Maiotze tribe, who have, it may be incidentally mentioned, solved the suffragette problem to a nicety. The man minds the baby while the woman works in the field. If the man has several wives the comely ones go to market and do the trading while the plain ones labor with the hoe and the reaper. When the railway goes through the section—if it ever does—the navvies will be the womenfolk of the country, if there are sufficient of them to be spared from their farms.

No difficult country was encountered up the river valley, but at the crossing of the Red River, which here constitutes the border of Kwangsi and Kweichow provinces, serious obstructions began. A reconnaissance of the Red River to a point about 115 miles from Poseh showed that the river could not further be profitably followed, tremendous gorges barring the way. The trade route leaves the stream and strikes to the plateau of



A rough section of the Yunnan-Tonkin Railway

Shingyi, the elevation rising in about ten miles from 1,989 feet to 4,913 feet,—a rise of 2,924 feet. A range of mountains running approximately east and west was cut through by the Red River, and in this section not even a footpath could be found. Exploration of the Kweichow territory in the vicinity and the adjacent region of Yunnan yielded nothing in the shape of an easy passage, the passes being high and the gorges impossible, so the engineer decided to climb the plateau of Shingyi instead of following the river route, a determination which was only come to after three months' active reconnaissance of a country through which the drainage percolated into the hills, streams flowing through subterranean channels rather than on the surface, and issuing at the foot of hills through holes varying from a foot to thirty and fifty feet in diameter. The range running east and west drops almost abruptly to the valley of the Red River, all the drainage of the Shingyi plateau percolating through it, but being an open slope it is possible to climb it easily, a grade of from 2 to 3 per cent. being obtainable.

From Shingyifu (130 miles from Poseh) Mr. Low located his line approximately along the trade route to Shingyi-hsien (175 miles from Poseh), a great centre of trade for Kweichow and Yunnan and the Canton provinces. In the palmy days of opium the trade centred at this town and millions of dollars were sent there yearly to make the purchases, foreign and other

merchandise following to recapture the silver. The prohibition of opium-growing has destroyed the superficial prosperity of Shingyi-hsien, and the region, and the poverty that has been caused is distinctly noticeable, though the farmers are now planting wheat and other cereals. Old women and young girls, men and boys, are constantly encountered without sufficient clothing to wear, though they have abundant food, the plateau being rich and productive. The difficulty is that there is no market for the grain, and consequently the opium has not yet been replaced by anything which will enable the producers to secure the wherewithal to purchase the cotton yarns, the piece goods, and the materials which they were wont to buy when opium was such a profitable, easily-handled crop. A railway will be the saving of this large rich wheat and grain growing region, and, since the climb from the Red River was practicable, immediately to tap this plateau, it was one of the strongest reasons which influenced Mr. Low to carry his line that way rather than pursue the Red River with all its precipitous gorges, almost impossible locations, and at the same time, much longer route. The staple food of the people of this part of the country is rice and native corn.

After traversing the plateau in Kweichow province the line crosses the Red River valley into Yunnan province, and proceeding up one of the branches of the Red River is able to take advantage of a rich level stretch, affording easy construction. As a range of hills divides this stream from Loping (230 miles from Poseh) that city will not be touched. Not only do the hills isolate Loping but they break up the rich valleys and compel a line to be located through gorges and along stiff hillsides, the streams in many places disappearing and flowing in subterranean caverns through the ranges, the entrance and exit of the water being separated in some cases by as much as two or three miles. Happily, a side stream was discovered through the valley of which a line could be built without high grades or much tunnelling. Thence to mile 230 from Poseh the route passes through comparatively level country. Notwithstanding that the country from this vicinity is most difficult, topographical advantages offer and by these it is possible to escape from the difficulties. At Tek Lai-po, (280 miles from Poseh), near the source of a branch of the Red River, the location leaves the valley of the Red River and crosses a range into the valley of Kutsingfu. The range runs approximately east and west to I-ling, on the French railway, but as Mr. Low's official instructions were to select a route obviating the

necessity of junctioning with this railway south of Yunnanfu, he decided, after carefully traversing and examining the range to the existing railway, that the spot chosen for the crossing was the easiest discoverable. In this section the mountains are most precipitous, the surveying party being compelled in many cases while searching for an easy crossing, to steady their slipping mules down descents by hanging to their tails. Round Teh Lai-po coal exists in abundance; it has no value; walking on the highway lumps are stumbled over; when the native wants to revive his fire he walks into his back yard and digs the fuel; a mule load can be purchased for 50 cash, and in the city it is sold for a little higher price. The country is dotted with crude charcoal furnaces and blast furnaces 15 to 20 feet high; iron exists in abundance, the hills being denuded of timber to supply the charcoal for the smelting; wrought iron is sold in blocks, and from this the natives have been long accustomed to make their household and farming implements. Once opium thrived; now corn replaces the erstwhile

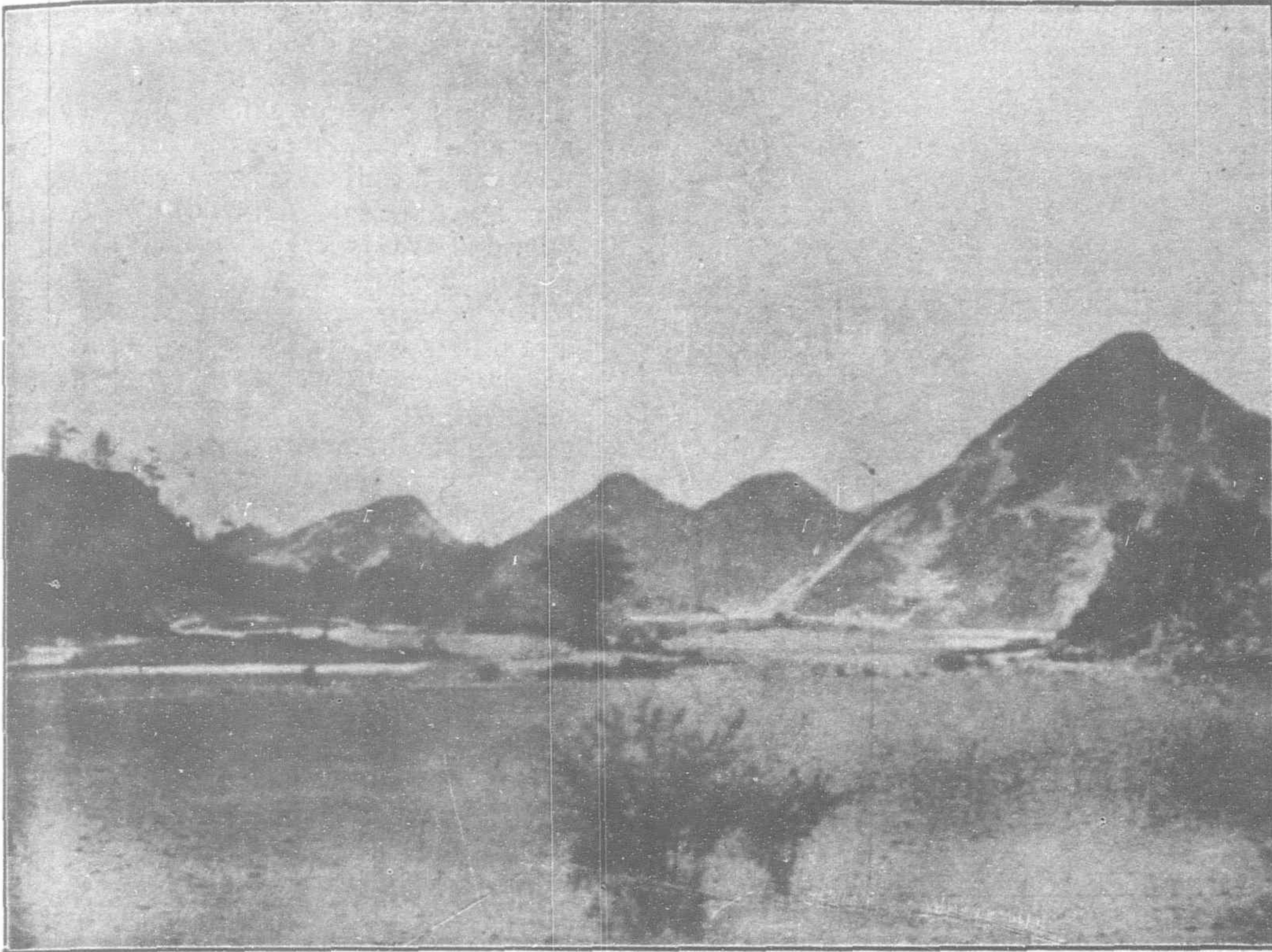
blooming poppy, rice being cultivated in the lowlands; but lack of communication with a market deprives food-stuffs of its value. The country being too cold for cotton cultivation, clothing is scarce, though the natives in the hills grow hemp from which to weave coarse garments. The valleys are cultivated by Chinese, the aborigines living in the mountains, the Chinese being mostly descendants of the soldiery engaged in the conquest of Yunnan, men who originally came, according to their descendants, from Kiangsu and Hupeh provinces.

The aborigines, speaking a different tongue, having different customs, mix very little with the Chinese, nor do they contribute to the development of the territory which they occupy. Agricultural and industrial effort is confined to the Chinese, but they exist in sufficient numbers in the cultivable valleys to provide a nucleus for much trade in the event of railway communication being opened.

Upon crossing the range the route lies along the valley of the Kutsing river, which is one of the richest valleys of the Yunnan province and which extends for a hundred miles from Kutsingfu (304 miles from Poseh) in one direction to I-ling, on the French railway. Here the river, like many others in China, flows in a bed higher than the surrounding country, being confined by high banks, which the Chinese are constantly increasing in height to prevent overflowing, instead of deepening the river. If the Chinese would realise that one cubic foot of silt taken from the bed of the river is worth ten cubic feet of soil placed on top of a dyke



Pumping Brine from Lighters at Suifu, Szechuan



On the Weining Plateau

they would avert many a disaster, and this fertile valley is now threatened by this miniature Yellow River which purls its elevated way along it. Yunnanfu derives much of its agricultural produce and fruit from this valley, all varieties flourishing in abundance.

At Kutsingfu Mr. Low's survey was stopped by the revolution, but as the remaining distance to Yunnanfu had been surveyed by Major Davies, the description of which is given later on, there was scarcely any need for a second survey to be run over the same route.

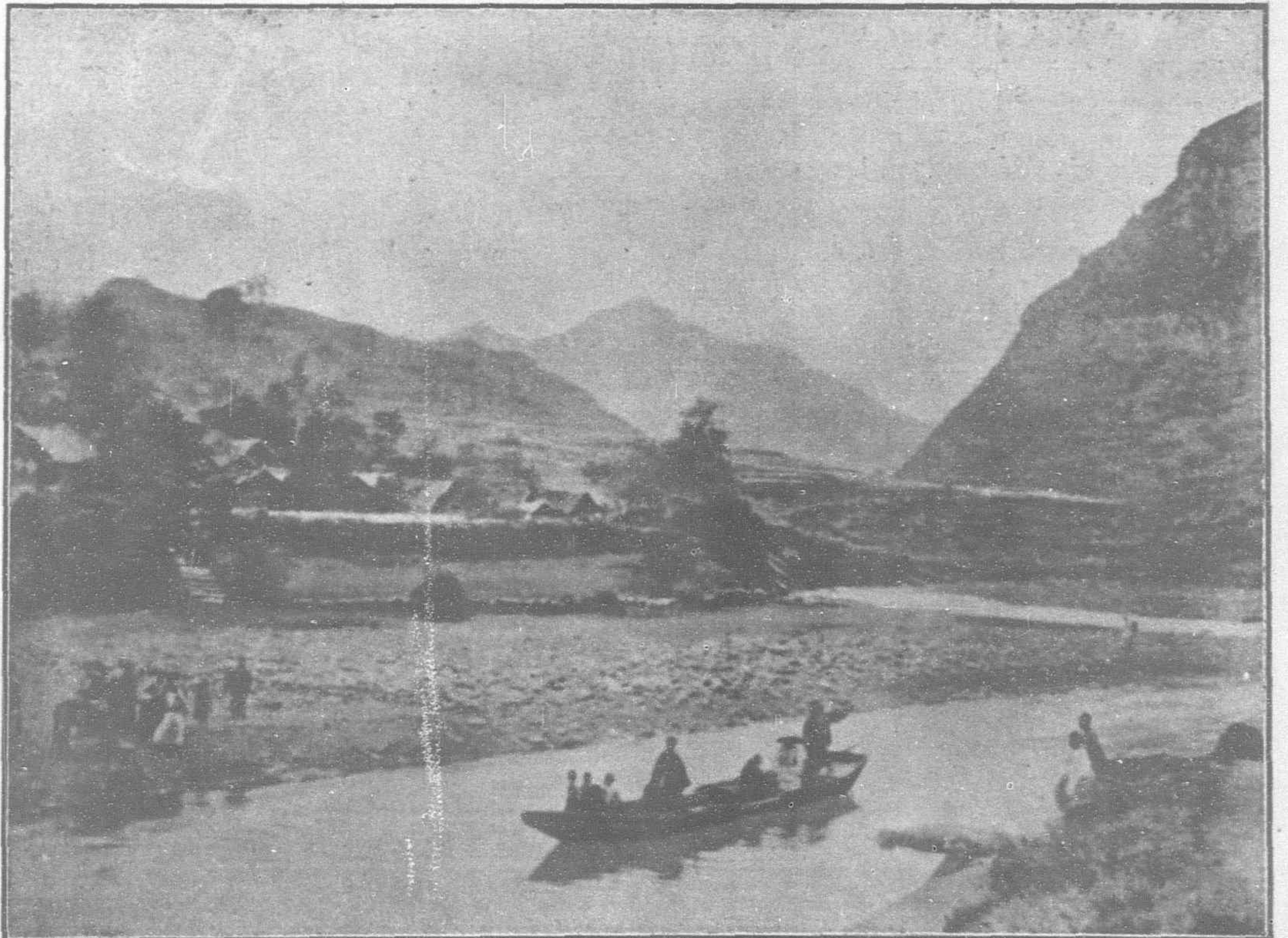
Mr. Low, had three parties at work to conduct his survey and in his report he provided an approximate estimate of costs, placing the total from Poseh to Yunnanfu, about 435 miles, at Taels 51,000,000, which, added to Taels 23,500,000, the cost from Poseh to the coast, would give an approximate total of Taels 74,000,000 from the sea to Yunnanfu.

A route estimated to cost £5,640,000, from Yunnanfu to Poseh, and a route different from that surveyed by Mr. Low, was reconnoitered by Messrs. W. S. Dawley and Arthur J. Moore-Bennett, but their line starts from a point on the existing French line south of Yunnanfu, taking off at I-lang, and therefore handicaps it by having a terminal in the hands of what would be a competing company. This survey is mentioned in the article appearing in another column from the pen of Mr. Moore-Bennett, and while the writer claims for it a cheaper cost it is questionable if it would serve the purpose of the Chinese as well as a line running further east and tapping Yunnanfu from a direction different from that occupied by the French. The French line follows the only available route from Yunnanfu southwards, the rugged mountains preventing any wide divergence, though the Chinese could, of course, build their own line parallel with the French one to I-lang, if they so desired, and if protests did not emanate from the French Company holding the rights of the line from Yunnanfu to the sea in Tonkin. That

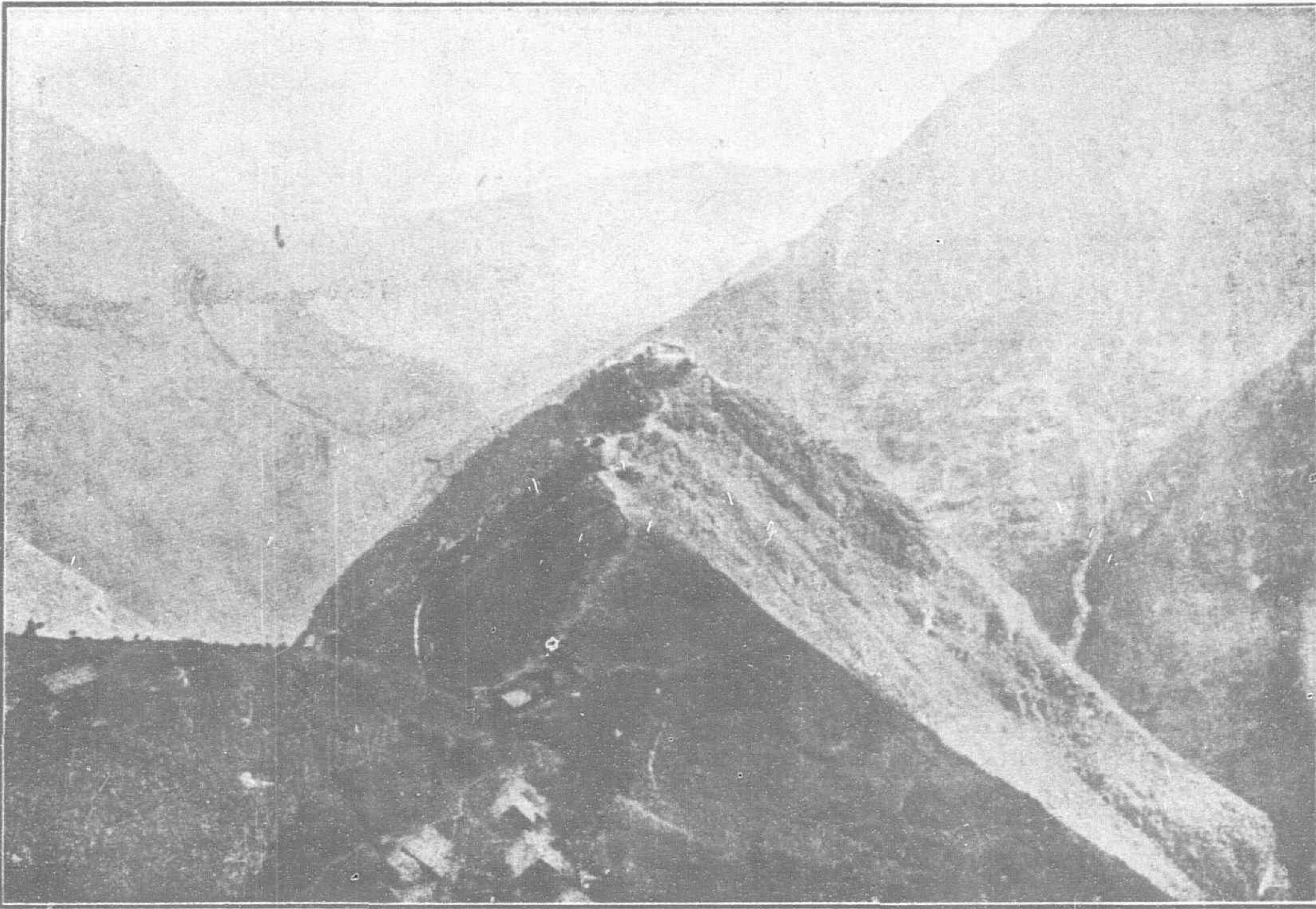
they would protest is certain since any line from Yunnanfu down the West River valley to the south-China seaboard would kill their Chinese goods and passenger traffic. For this very reason, too, it is more than probable that the French are not likely to take any early steps to float a loan to China to establish competition with the French owned line in Yunnan that would certainly prove disastrous. The fact that China has given the agreement to French capitalists will deprive her for some time of a line which she ought to have into Yunnan unless she is able skilfully to play her cards, or bring some sort of pressure to bear to have the agreement brought into effect. The French *raison d'être* of the agreement was twofold, first to obtain the right to the line from the south coast to Yunnanfu, and thus prevent any nation from securing it, and second to obtain the right to the line from Yunnanfu to Szechuan, a line that will be built if possible, and if other nations do not successfully oppose it, in order to give France the domination she requires and also to benefit the line already existing. France aims at securing the handling of all trade south of the Yangtsze, and she could easily do that did the railway company not act so injudiciously with regard to freight rates.

From Yunnanfu to the Yangtsze

Although the route between Yunnanfu and the Yangtsze has been much travelled, and has been the subject of preliminary reconnaissance by Major Davies and Mr. Dawley for a feasible railway route, the fact remains that the wild mountainous character of much of the country demands closer attention before a line can definitely be decided upon. Major Davies sums up the investigations of his party in favor of a line through Weining, reaching the Yangtsze at Suifu, 1,500 miles from the sea, the alternative route from Weining to Nachi, opposite Luchow, being so difficult and through such intricate country, that rack lines of 1 in 16 and 1 in 12 would be necessary, though the last



Ferry over the K'o-tu Ho, in North-western Kweichow



A Valley in Yunnan, near Chaotungfu

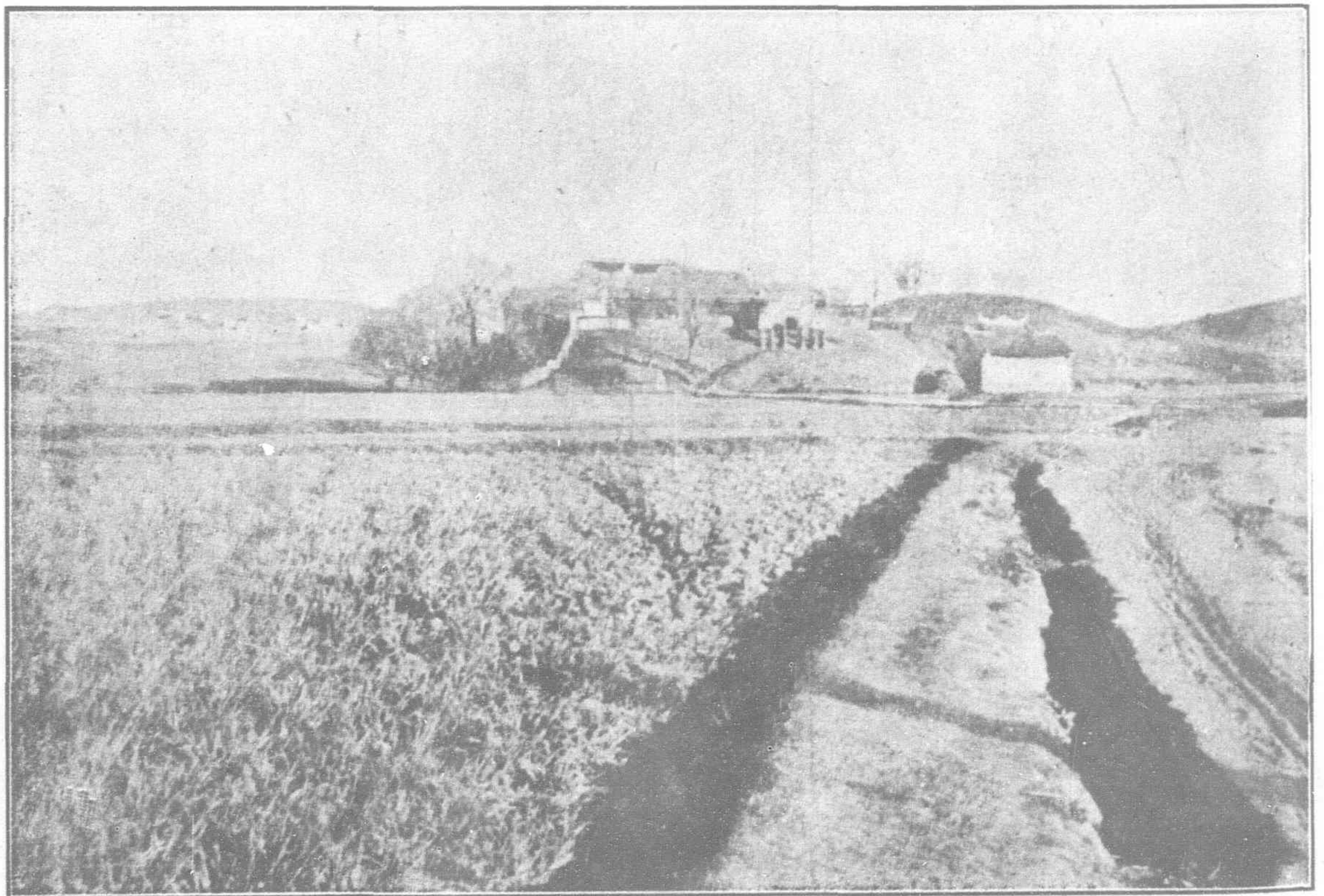
fifty miles to the Yangtze would follow the Yungning river and be comparatively easy. The thought of a rack road is sufficient to put this route out of question, and until more is learned by close investigation by surveyors it must be discarded in any discussion on the subject. Major Davies, therefore, marks down as possible a line from Yunnanfu, through Kutsingfu, branching north-westwards from Weining, through Chaotung to Suifu, but in that there are very steep ascents giving grades as steep as 1 in 25. For the first fifty-five miles from Yunnanfu the road passes over rolling plains, but from the north end of the Suanwei plain a line would be difficult for 70 miles, with steep gorges to negotiate. Beyond that to Chaotung the road is fairly easy, but further on difficult gorges have to be traversed down the course of the Heng river to Takwaniao, over a hundred miles from Weining. On the lower part of the Heng river the road is fairly easy for the next 90 miles to Suifu, the Yangtze river being crossed by a bridge at Anpien, some 15 miles south-west of Suifu. 425 miles from Yunnanfu.

The present traffic from Yunnanfu to the Yangtze is carried over one of two main roads, one passing through Tungchwanyun and Chaotungfu to Suifu, and the other running along the telegraph line through Kutsingfu, Suanwei and Weining, striking the Yangtze at Nachi. On the way from the capital across the Yunnanfu plain the traveler is impressed by the rows of cypress trees growing along the embankments of the irrigation canals, by the hand wheels used to lift the water from lakes and ponds, and by the small carts drawn by a bullock or a buffalo, not for the purpose of transportation, but for farming operations. Two days journey from Yun-

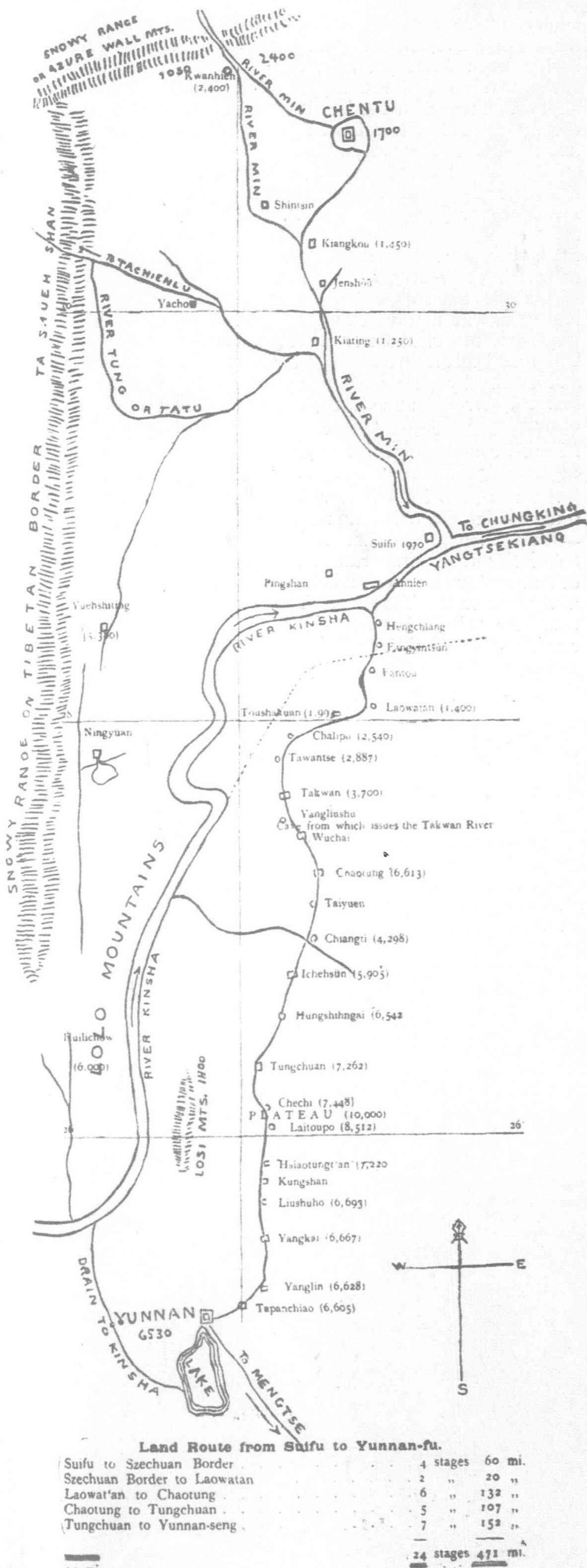
nanfu the Yiliang plain, lying at 5,300 feet—an exceptionally low one for this part of Yunnan—is reached, and the third day a large plateau with an elevation averaging 6,000 feet is ascended. Two days and a half over gentle undulations through bare and dry country, bearing poor and scanty crops; traversed everywhere by carts; marked by peculiar pillars of sandstone rising 20 feet in the air, brings the traveller to the north end of the plateau where it precipitously descends to the Kutsing river. A fine thirteen arch stone bridge, 120 yards long, crosses this tributary of the West River and permits a dry shod entrance to Lu-liang, a poverty-stricken town, but with a reputation for scholarship. One of the finest plains in Yunnan, extending for over fifty miles with an average width of about five miles, is traversed to Kutsingfu. The northern portion is very fertile, while the south is not so well irrigated and crops are poor. Northwards further undulating country is crossed, marked by a series of little cultivated plateaux, with low rocky hills raising out of them, and most of them without any running water. Coal is plentiful and hardly anything else is used

as fuel, 200 cash a cartload or about Mex. \$1.50 per ton, being the selling price.

Coal mines which might be extensively worked if better means of communication are supplied have been opened all around Suanwei. Two days march further north copper is also mined in many places. Steep hills are ascended and sharp descents traversed before the Ko-tu river—1,000 to 2,000 feet lower than the neighboring valleys,—is reached. It is the longest source of the West River, and marks the boundary of Yunnan and Kweichow provinces. Dry hilly country marks the way to Yaochan, where copper is mined out of the solid rock, caves being cut in the hill-sides by the miners. There are no deep shafts, the miners working with hammers and wedges, and producing an average of a mule load of ore in two days. The



Country near Chaotungfu, Yunnan



ore varies a good deal in quality, and sells at about 25 cents for 100 lbs. the best being said to produce 10 per cent. of copper. The copper is sent to Kweiyang, the capital of Kweichow Province, where it is minted into cash.

The hill tops in this part of the country rise to 8,000 feet and form the water shed of streams which feed a large lake near Weining, a poor town with an elevation of 7,500 feet whose importance lies in the copper, silver, lead, iron and zinc mines which abound. The people in the region showed much hostility to Major Davies' surveyors, rolling stones down upon them from the mountain heights, and shooting at them, but always running away if chased by the surveyors. Boilers and mining machinery had been bought and transported to this place by the Yunnan Government but never used, copper mining on an elaborate scale not paying on threepence per pound, the price given by the Government for the product.

The route thus far, judged from the point of view of railway construction, may be described as difficult. After leaving the Suanwei plain an intricate mass of mountain chains is encountered, while, to make matters worse, right across the route which the railway must follow, runs the Kotu river, 1,500 to 2,000 feet lower than the neighboring valleys. Captain Watts-Jones, one of Major Davies' party, reported that the country would be quite impossible for a railway were it not for one feature—the valleys are flat at the bottom and fairly broad, generally 50 to 150 yards, and seem to have no sudden drops. The stream spreads over half of the valley but is always very shallow, and fields a foot above the stream seem to escape serious flooding. Taking advantage of this conformation of the ground the surveyor was able to find a fairly practicable route, chiefly following the river valleys to Weining (7,500 feet.)

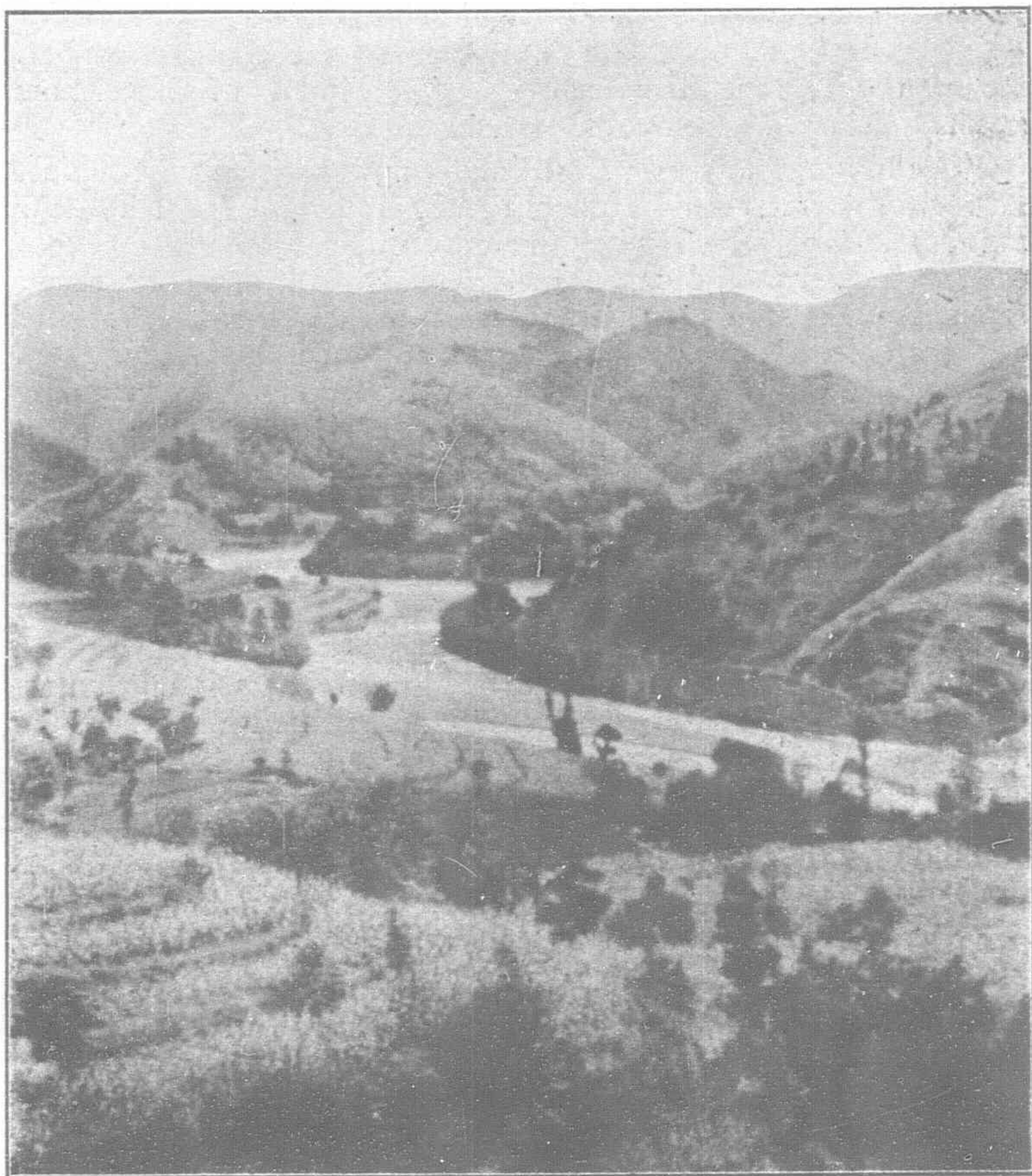
From Weining, 225 miles from Yunnanfu, two different routes were reconnoitered to the Yangtze, one via Pichieh to Nachi, and the other via Chaotung to Suifu. Along the first route the country is extremely difficult between Weining and Yung-ning. Some very heavy gradients are necessary to get over the ranges of hills, and the river valleys, often running through steep-sided gorges, do not lend themselves to railway construction. For a few miles rack lines on 1 in 16 and 1 in 12 would be necessary. Should it be advisable to adopt this route the work would be very expensive. From Yung-ning, fifty miles from the Yangtze River, the work of construction would be comparatively easy with no very steep gradients.

The route via Chaotung, would, as far as that city from Weining, lie over open rolling downs, and there is only one difficult bit, where at Taotienpa an affluent of the Niu-lan river has cut out its valley below the level of the Chaotung plain.

From Chaotung onwards the line would have to follow approximately the main road, that is to say, it must cross a low pass at the head of the Chaotung plain, and thence follow down the banks of the Heng Chiang to the Yangtze. The upper part of the Heng is decidedly difficult, with a bad gradient and very steep side-slopes. Mountains tower on all sides. Lower down, the valley gradually improves for railway building, and where it debouches at An-pien there is a good place to bridge the Yangtze, and from there on to Suifu is fairly easy.

Coal and minerals occur throughout this region and near Suifu, coal is mined high on the cliffs above the river. According to Capt. Thos. W. Blakiston, it is practically straightway shipped into junks from the pit mouths. His description of the operations shows that "having to be got at a great height up in the cliff, very thick hawsers, made of plaited bamboo, are tightly stretched from the mouth, or near the mouth, of the working gallery, to a space near the waterway where the coal can be deposited. These ropes are in pairs, and large pannier shaped baskets are made to traverse on them, a rope passing from one over a large wheel at the upper landing and down again to the other, so that the full basket going down pulls the empty one up, the velocity being regulated by a kind of brake on the wheel at the top. At some places the height at which the coal is worked is so great that two or more of these contrivances are used, one taking it to a landing half way down, and another thence to the river. The hawsers are kept taut by a windlass for that purpose at the bottom."

Mr. Dawley's route leaves Yunnanfu, via Yanglin, Sungming, Tungchuan-yun, Chaotung, Anping and Suifu.



Near Tong-ch'uan-fu, Yunnan

The line would descend from the limestone ridge on which Yunnanfu stands and cross the plain with its limestone pinnacles, serrated ridges, and crags. A paved road over undulating moorland now leads to Yanglin, 7,000 feet above the sea, and 800 feet above Yunnanfu, and leads thence over a great plain of rolling country traversing timber, and mounting ridge after ridge till a narrow valley between high steep mountains ascends to a pass 1,800 feet high. Another 500 feet leads to a plateau studded with rounded hill tops, with ranges in the far distance, cultivation being carried out in the intervening spaces. The crossing of a range 2,000 feet high opens up the plain of Tungchwanyun, a fertile, irrigated stretch, with numerous villages nestling by canals carried between high dykes. Small boats navigate these streams and give intercommunication to the villagers, a poor, hardworking people suffering from the extortion of gentry and officials who own most of the land and who live in comfort within the city walls. The plain gives way to another mountain ridge, the road crossing a pass 9,000 feet high, followed by narrow valleys inhabited by rice-growing Chinese, who occupy comfortable farmhouses. Limestone ridges are ascended in succession, with fertile plains between, till near Chaotung, a suspension bridge of handsome design, with solid brass lions and monkeys at either end, spanning the Niu-lan river, over 100 feet wide, and giving access to Chaotung, a walled city 7,000 feet above sea level. The plain

is dry, fertile and rich and is surrounded by rugged mountains, the crops harvested being large and consisting of maize, oats, barley, buckwheat, potatoes, etc. The plain extends ten miles with a width of about twenty, the road eventually climbing uplands on to another plain bordered with limestone ranges, whence a descent is made after crossing the Lohan-ling pass. What is known as the Yunnan plateau is thus left behind for country of quite different character. The difficult road leads between high limestone cliffs, the view from the heights being one of rolling mountains or jagged peaks. A tortuous and difficult descent of the "Corkscrew" pass, a drop of 4,000 feet, eventually takes the road over a handsome suspension bridge 75 feet long spanning the rushing torrent to Laoyatan, a city of 20,000 inhabitants, 2,000 feet above the sea, and 200 feet above Suifu. Cliffs up to 600 feet high, with limestone ranges closing in on the valley, mark the way north to Suifu, the river tearing between precipitous gorges. The road becomes narrow and broken as it leads over steep ranges and eventually passes through spectacular limestone mountains, scarred, serrated and fluted, to Anpien, thirty miles from Suifu.

The bed for a railway could be laid along this route, Mr. Moore-Bennett says, for £7,000,000, there being but a few engineering difficulties, though at times heavy grades.

Suifu (800 feet) is a walled city which handles the transit trade coming down the Min river—navigable for hundreds of miles—from Chengtu and that section of the Red Basin tapped by the tributaries of this important river. It is, too, the centre of an excellent coal area, as well as being considered the head of deep water navigation on the Yangtze. The region is very mountainous and near here "all the barriers of the western highlands touch on the confines of the Red Basin." The city is a large distribution centre, and is advantageously situated at the junction of the Min and the Yangtze. Most of the import trade of Szechuan passes via the Min, its affluents, and the numerous canals connected with it. In addition to the exports of wheat, barley, oats, corn, rice, hemp, white wax, medicines, nut galls, pig's bristles, rhubarb, fungus, hides, tobacco, lead, zinc, etc., coming from the Red Basin, it also handles the gold, copper, furs, skins, musk, wool, etc., brought in from Tibet and western Szechuan.

To take a railway to Chungking another bridge would be necessary to cross the Min river, and thence the line would probably pass through Nanchi-hsien to Luchow. One estimate places the cost of building at about Taels 100,000 per mile, this far the mountains not being excessively difficult. From Luchow,



Yachowfu, Szechuan. A Stone Bridge over the Ya River



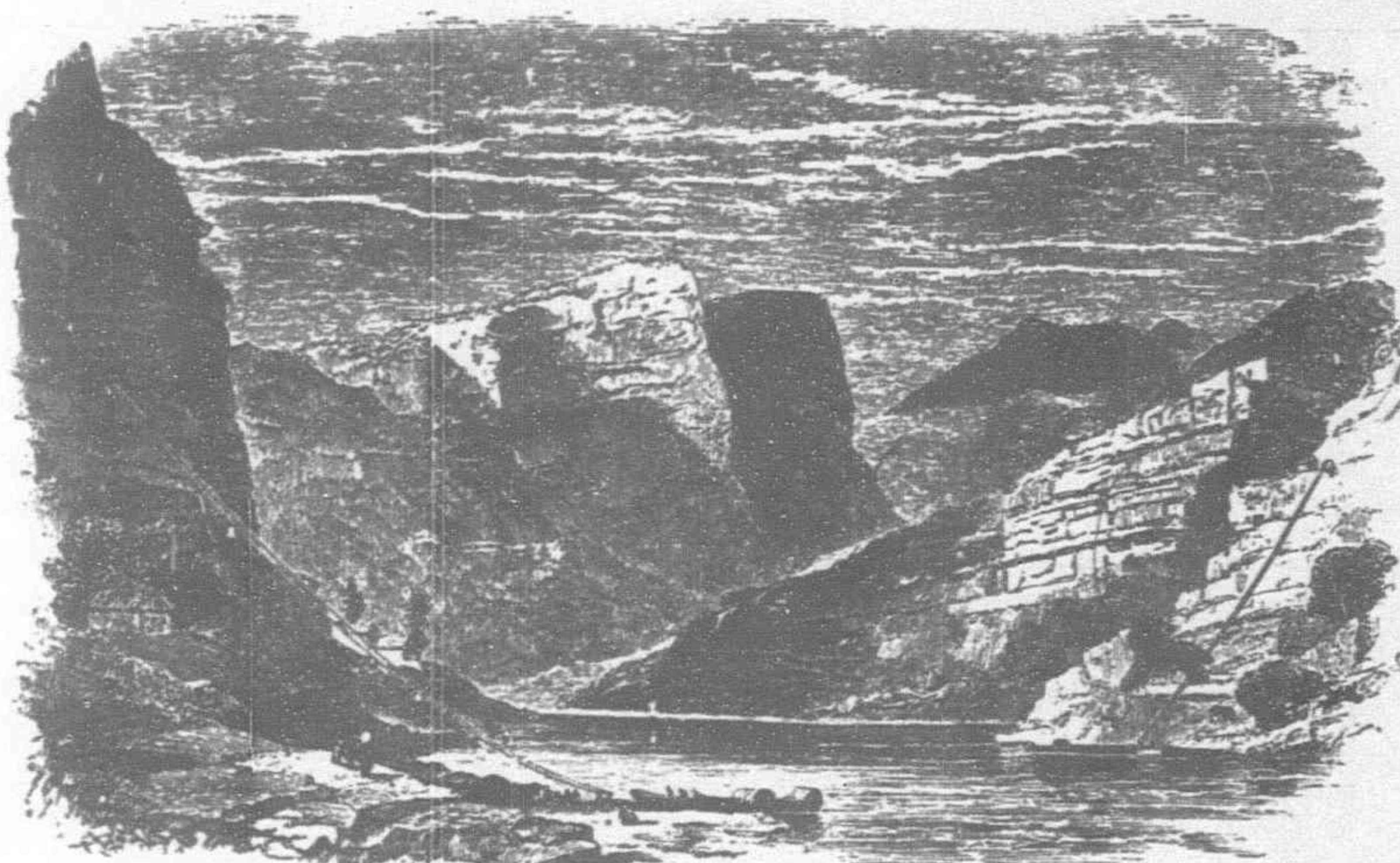
Near Sui-fu, Szechuan



On the road from Chaotung to Yunnan

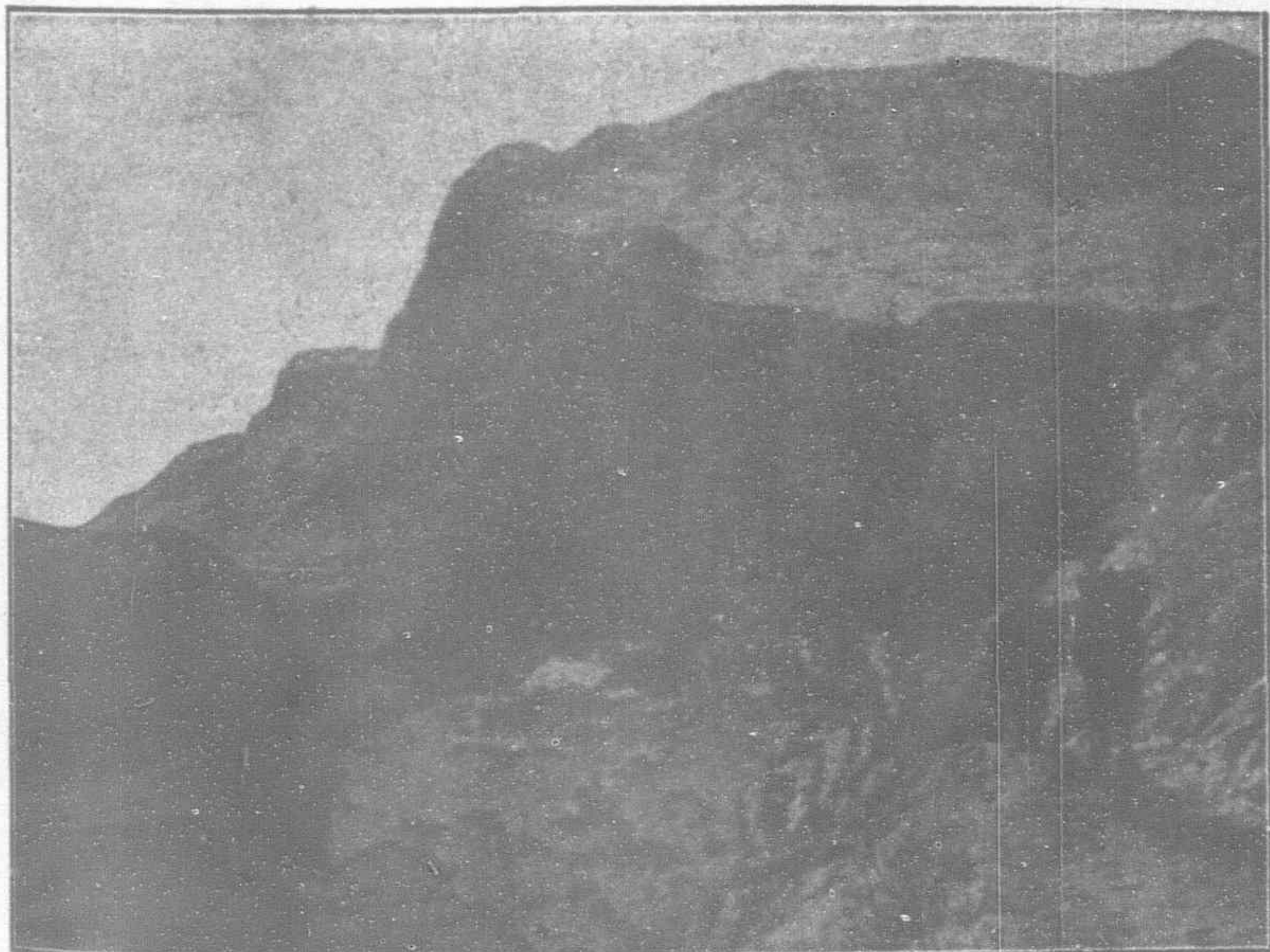
where the Lu river would be crossed, the ranges become more persistent and the road runs north-east to Yungchang-hsien (1,220 feet) about twenty miles from the river, the next twenty-five miles to Chungking being almost due east. The cost of the line from Luchow to Chungking would run probably to Taels 110,000 per mile, or a total of Taels 15,000,000 for the 145 miles.

The railway from Yunnan to Chungking is designed, of course, to give the French port of Haiphong direct connection with the important commercial centre of Chungking, and with Chengtu by the railway to be built by the Hukuang Group. Naturally it would tend to diminish in a measure the traffic which the builders of the Hukuang system hope to derive from their lines. When they



Coal Gorge on the Yangtze (Blakiston)

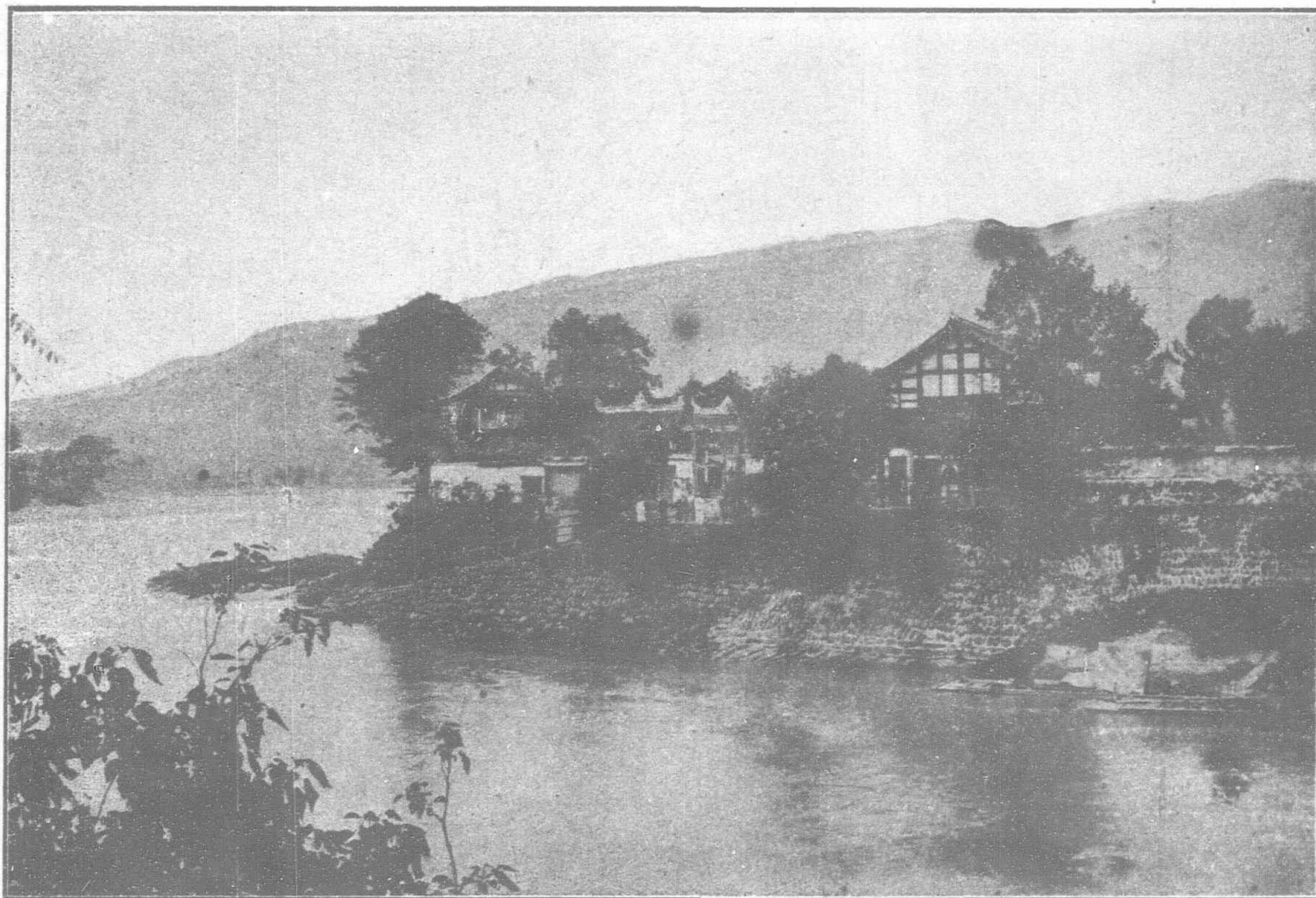
planned the line from Hankow to Chungking and Chengtu, they anticipated collecting the trade at both centres and picking up what might come down river by junks or steamers from Suifu and the Min river valley. If the French line to Chungking is built it will, if freight rates are favorable, do much to draw trade towards the Indo-China seaboard, not only from Chengtu, via Chungking, but also direct from Chengtu by way of the Min river. This is an aspect of the matter which has probably not escaped the attention of the Hukuang Group, and realisation of it will very probably compel them to come to some arrangement to have the section dropped by the French even if the line to Suifu is constructed. However, French aims are not likely to be subor-



Parrots Beak Mountain, Yunnan



Tea Carriers, Carrying Tea into Tibet, each bundle weight 250 lbs.



The Ya River at Yachow, Szechuan

minated to other considerations. The French have secured what they have been long seeking, the right to build a line through Yunnan to Szechuan with Chinese money and not their own—as was employed on the Tonkin-Yunnanfu railway—and it is inconceivable that they will lightly give their long-cherished ideas up, or even modify them, without a desperate struggle. It is the obvious task of the Hukuang Group, of course, to minimise competition with their costly line, and it will be interesting to see whether any steps will be taken with this end in view.*

From the Yangtsze to the South-west of Kweichow Province

While the problem of opening railway communication with Szechuan and Yunnan provinces has been on all men's minds—that is all men interested in the west of China—for many years, little has been said of the desirability of specially considering the claims of Kweichow province. That, of course, is understandable. The Yangtsze gave access to Szechuan and to Yunnan, while Kweichow has been hidden away behind its mountains practically unknown, having no rivers to command attention, and most difficult highways to dampen the ardor of the mere seeker after commercial possibilities. It came somewhat as a surprise, then, when it was announced that an agreement had been signed with

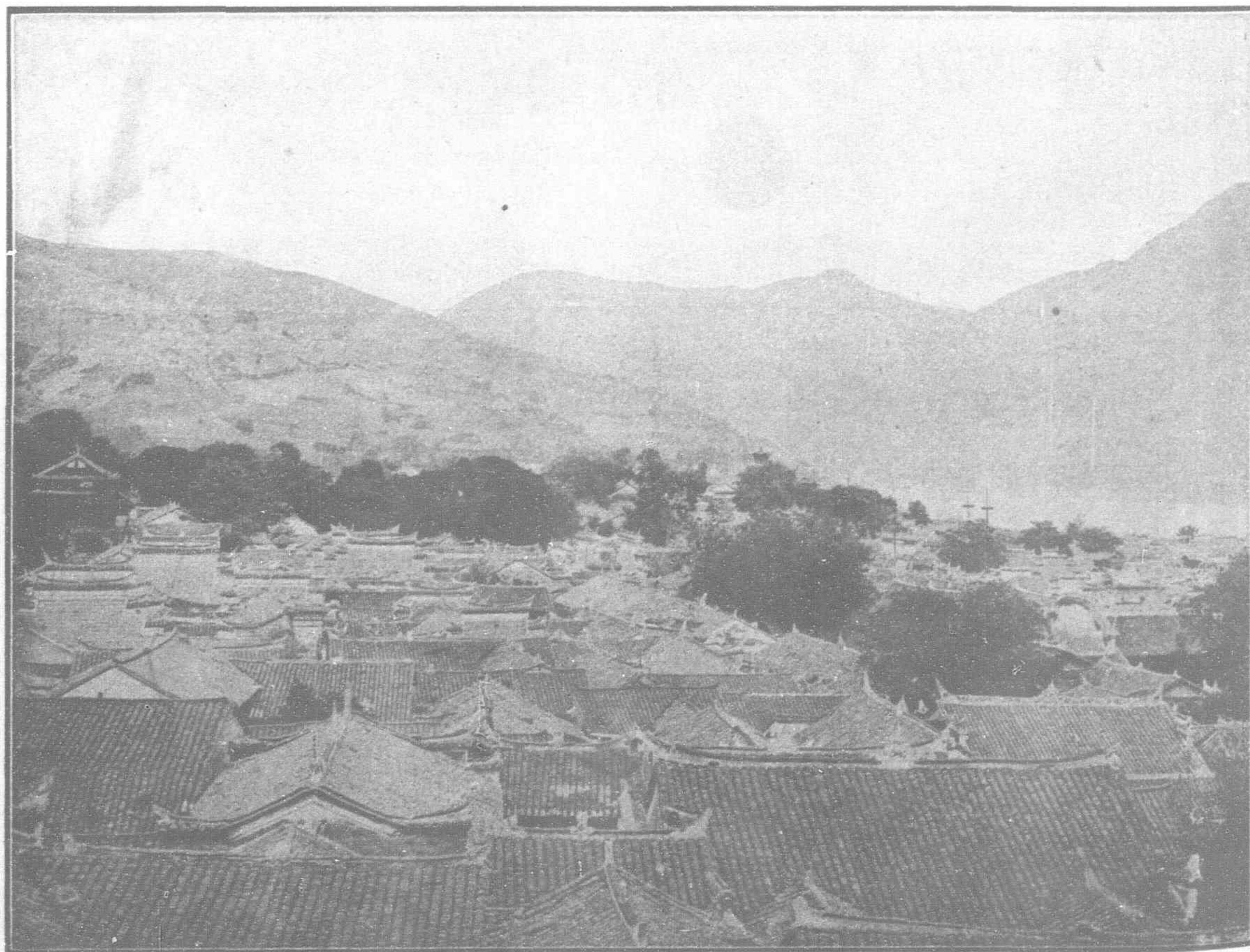
* Since this was written it has been reported that it is probable the Hukuang Group will protest to the Chinese Government against the right given to France to build the Yunnanfu-Chungking line.

the British firm of Pauling and Company for the construction of a railway from a point on the Yangtsze, opposite Shasi, to Shingyi, a name on the map in the south-west of Kweichow, but unknown in the geography of the general student of China. Yet this line is one of exceeding importance, both to Kweichow and Yunnan, as well as to the Central Government.

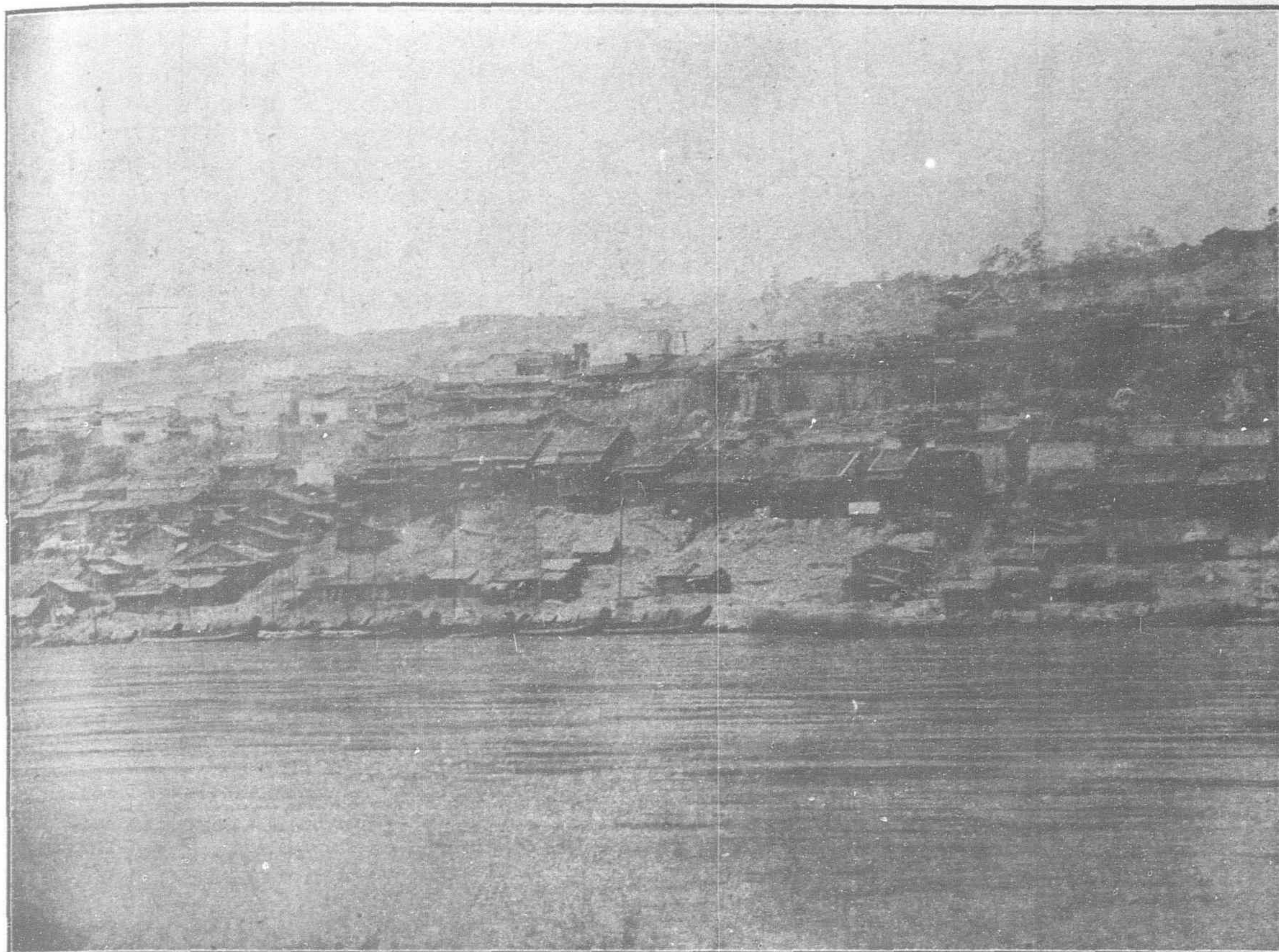
After travelling through Kweichow with the Blackburn Chamber of Commerce Mission Mr. F. S. A. Bourne set it down in the report of the Mission that "in no part of China would railways be of more advantage to the country than in this province, where there is no water traffic at all except on the eastern side, and there very difficult." The best road to follow would be through Hunan to the Yangtsze, near Hankow, a line which, Mr. Bourne hazarded, would pay at once.

The railway which the Chinese Government propose shall be built will follow the trade route from Hunan, and a point

opposite Shasi, on the Yangtsze, some miles west of Hankow, was selected as the starting off point owing to the impossibility of building a railway across the low-lying, semi-flooded country to the south and south-west of Hankow. As direct rail connection with Wuchang, opposite Hankow will be impossible, either a branch line will be run from the Hankow-Szechuan line to Shasi, which could be reached by a ferry across the river, or water connection with Hankow will be availed of. Shasi is growing important enough to merit the connection with the



The City of Kweichow, situated on the Yangtsze River, Szechuan



A part of Chungking, Szechuan

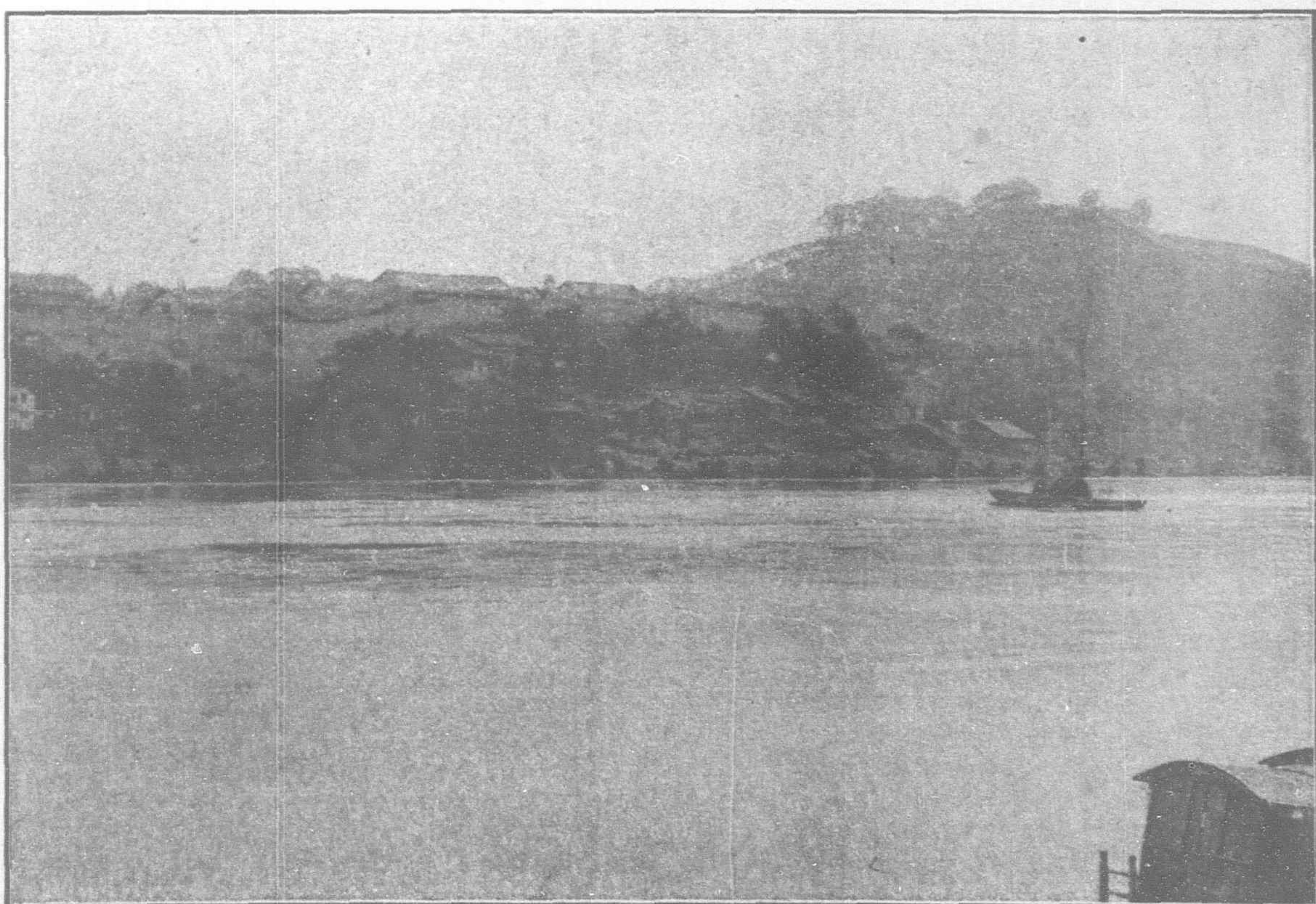
trunk-line-to-be, and the desire of the Government to have lines of communication with distant parts radiating from Hankow will no doubt dictate as rapid connection as possible being effected with the line into Kweichow province.

Of Hupeh cities Shasi (with a population of 96,000) ranks second in importance to Hankow, and its geographical situation in the centre of a vast system of canals and waterways connecting it with populous and fertile portions of West Hupeh and Hunan must secure it still a more important position in the future. That is the opinion of the Commissioner of Customs there. He reports that a careful computation of the trade of the port which does not pass through the Customs offices, exclusive of salt and opium, gives a healthy total of Taels 8,000,000. Its prospects of developing into a promising milling town are also exceedingly good since it is already noted as the headquarters of a considerable cotton trade, and has been long famous for its nankeens, in the production of which every hamlet and village in the district finds employment. The Commissioner declares that capital is to be found in the district, as well as the desire to invest it in anything spelling profit and progress, and he urges firms who propose to open on the Upper Yangtze to study well the potentialities of Shasi before going farther afield. It may seem paradoxical, he adds, but were Shasi the terminus of large steamer traffic instead of Ichang, thus giving local exporters an equal chance of securing freight, it is conceded that the Customs revenue here

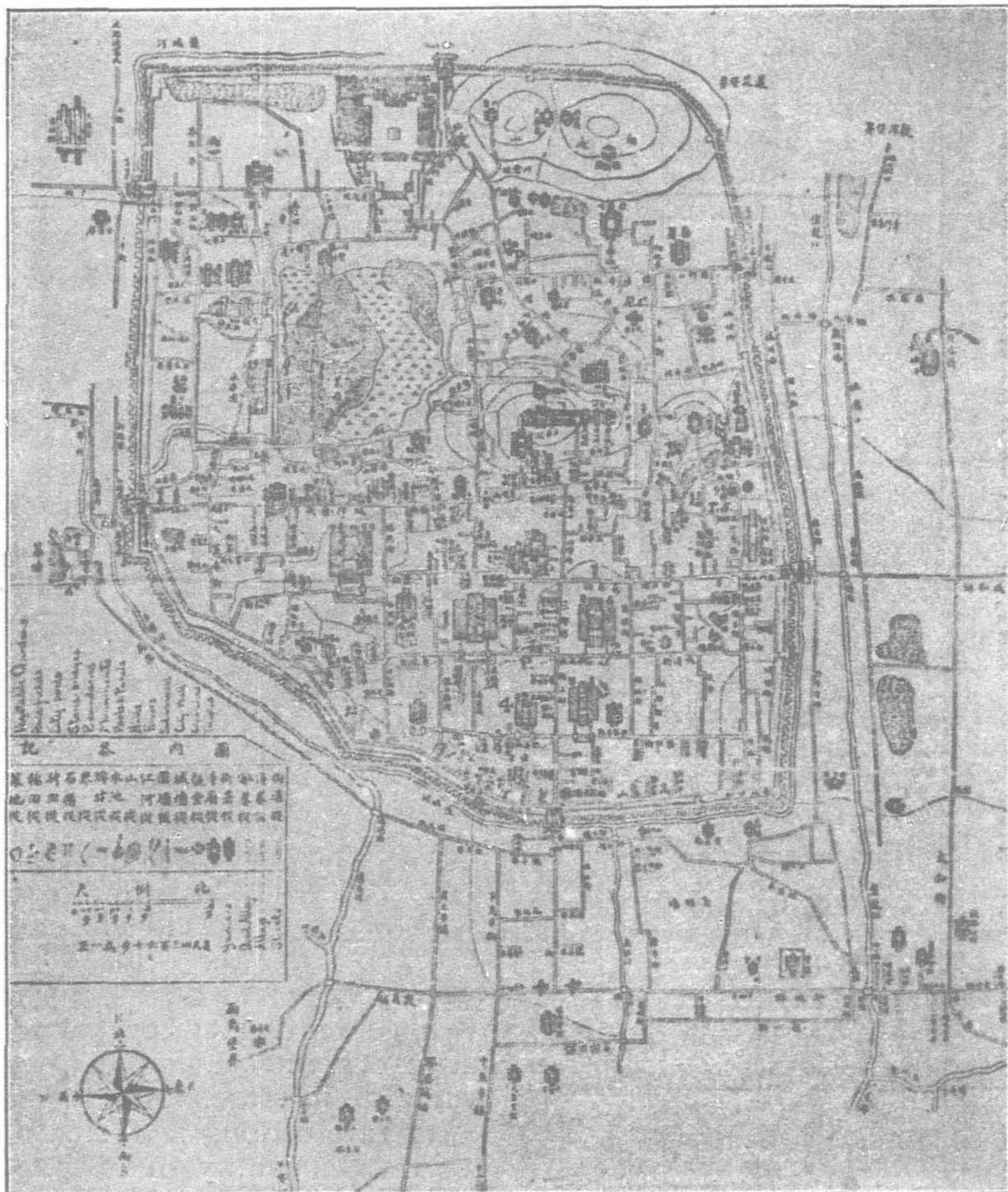
would be twice, or treble, that now returned from the two ports. Shasi has, however, robbed the adjacent city of Kinchowfu of its one time importance. It was once the capital of a large province, and, under the late dynasty, the seat of a considerable Tartar garrison, but by the end of 1912 over 12,000 Manchu and an equal number of Chinese left the city, many going to Shasi and other less settled districts in the region. Though Kinchowfu will no doubt continue as a centre of an increasing nankeen, weaving, and silk trade, it is unlikely ever to attain its former prosperity. In 1912 the net value of foreign imports at Shasi was Taels 3,868,831, cotton yarn, cotton piece goods, sugar, indigo, dyes, and kerosene oil being the chief items. The Customs report for 1912 states that cotton piece goods increased heavily and must increase, while the demand for cotton yarns and indigo to supply the huge weaving industry carried on in the surrounding districts will also increase. Among exports raw cotton, raw silk, an enormous quantity of nankeen,

vegetable tallow, beans, cereals, seed and seed cake, medicines, hides and fungus, figure chiefly. Bean and seed-cake mills are increasing in the interior, and paper of fair quality is exported by junk in increasing quantity. A flour mill with British engines and Japanese plant has been erected in the vicinity, and a large weaving factory with modern machinery is in course of completion.

The statement is made that Shasi nankeens are to be found in every village of Szechuan and Yunnan province, a trade which will surely develop immediately railway communication



The Northern Suburb of Luchowfu, Szechuan, at high water Season



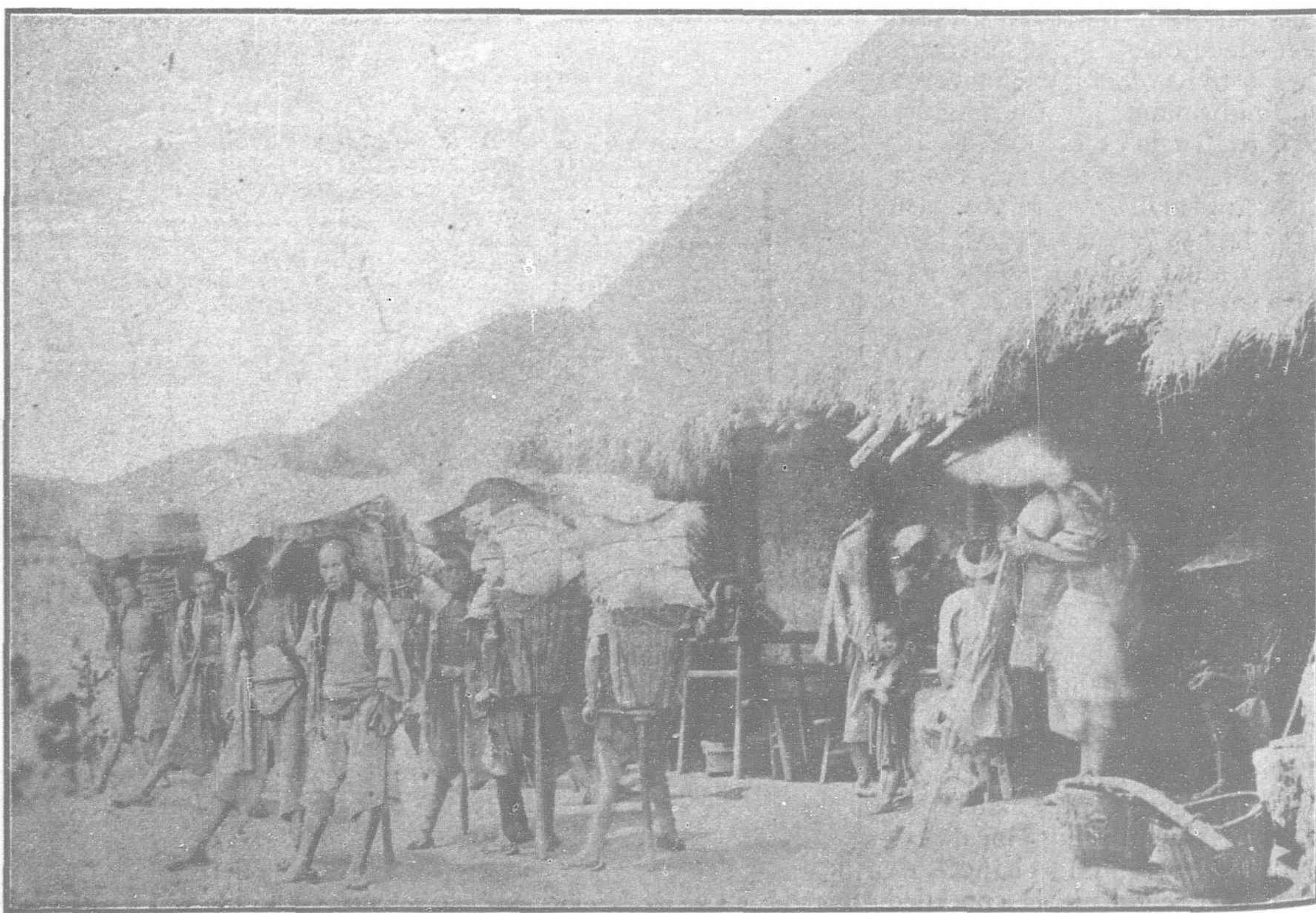
Map of Yunnanfu, Capital of Yunnan Province

is opened to Kweichow province. It costs under present conditions at least seventy-five cents (or 1s. 6d.) to carry a 12lb. piece of grey shirting from Hankow to Kweichow, and Taels 18 to transport a bale of yarn, in each case 20% ad valorem. At present the trade flowing direct from Shasi into the southern hinterland is carried by junks across the Yangtze and down the canal systems which dissect the country to Changsha. The main road, along which the proposed railway will no doubt run, if it is built,—for everything depends upon the survey now being carried out—goes south by west over low plains for twenty-five miles to Kungnan, when higher ground can be taken advantage of to Lichow, on the Ling river, a feeder of the Tung-ting Lake, thirty or forty miles to the east. At Changteh, on the Yuankiang, the road branches to Changsha, the capital of the province, the main route keeping south-westward along the Yuan river into Kweichow province. Changteh, by virtue of its position on the Yuan river and the highway to Kweichow and Yunnan is an important distributing centre, where a busy trade is carried on. Here all the junks start on their arduous journey up the rapids of the Yuan-kiang, and likewise the trade that is brought down is handled and sent off to Changsha or Hankow. The region thus far passed through and on to Changsha depends

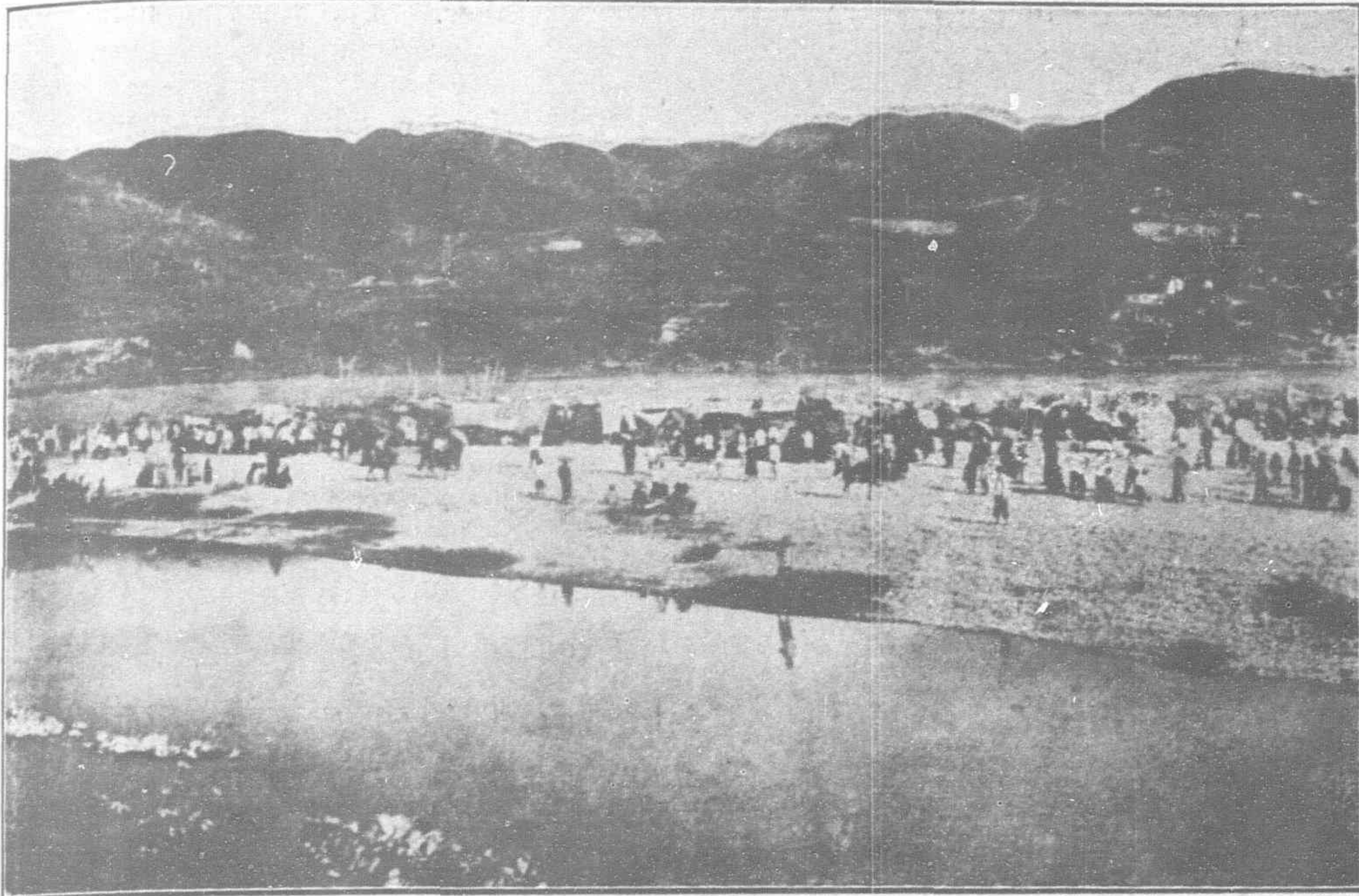
solely upon coolie transport. Wheeled vehicles are taboo—and the pack-horse is not tolerated. Man and merchandise are conveyed by coolies, the former in unwieldy chairs.

Changsha is about 110 miles from Yochow, on the Yangtze, at the entrance to the Tunting Lake, and about 245 miles from Hankow by the river and lake. It enjoys the distinction of being one of the old famous cities of China, since the Taiping rebels were successfully resisted there. The population, estimated at 250,000, is decidedly conservative, but their city is regarded as one of the finest in China from the point of view of wealth of the people and size and character of the shops, the condition of the streets and public buildings. It is situated on the east of the Siang river, the perimeter of the walls—which are close to the river on the west side—being about five miles. The streets are stone-paved, clean, but narrow; the shops handsome and stocked with large assortments of goods. Gradually the people are losing the anti-foreign sentiments for which they were noted and the result is a steady advance in commerce.

The returns of the Customs Commissioners show a growth which is striking. The net value passing through the Customs in 1912 was Taels 22,038,368, an increase of Taels 4,348,000 over the figures for 1911, and more than double those of 1909. Yet the upward trend has only commenced. Imports absorbed Taels 3,301,000 of the increase, and export figures would have been some Taels 2,000,000 more had it not been for the restricted output of the Pingsiang Collieries owing to the temporary cessation of work at the Hanyang ironworks, near Hankow. The increase in foreign imports direct and coastwise, was contributed mainly by shirtings, jeans, cotton yarn, copper, (ingots and slabs,) bags of all kinds, arms and ammunition, indigo, kerosene oil, paper, machinery, refined sugar. Copper was imported for the mint, and the doubling of the value of dyes was due to the presence of foreign agents in the port. Chinese exports comprise two kinds (1) articles bought by foreign merchants for export abroad, such as ores, metals, beans, bristles, fresh eggs, feathers, hemp, hides, nutgalls, tea and wood oil, rape and sesamum seed, vegetable tallow and varnish; and (2) articles exported by Chinese firms for domestic consumption, as arsenic, bamboo shoots, black beans, coal and coke, preserved eggs, fire-crackers, grass cloth, lard (for use of Chinese in Straits Settlements), lotus-nuts, medicines, nankeens, 2nd quality paper, steel bars, tobacco, paper umbrellas; and articles bought by Chinese firms for sale to foreign merchants in other markets such as fire-crackers, human hair, hemp, black tea, and tea stalk. The



Salt Carriers in Kweichow Province



The River at Panghai—Kweichow

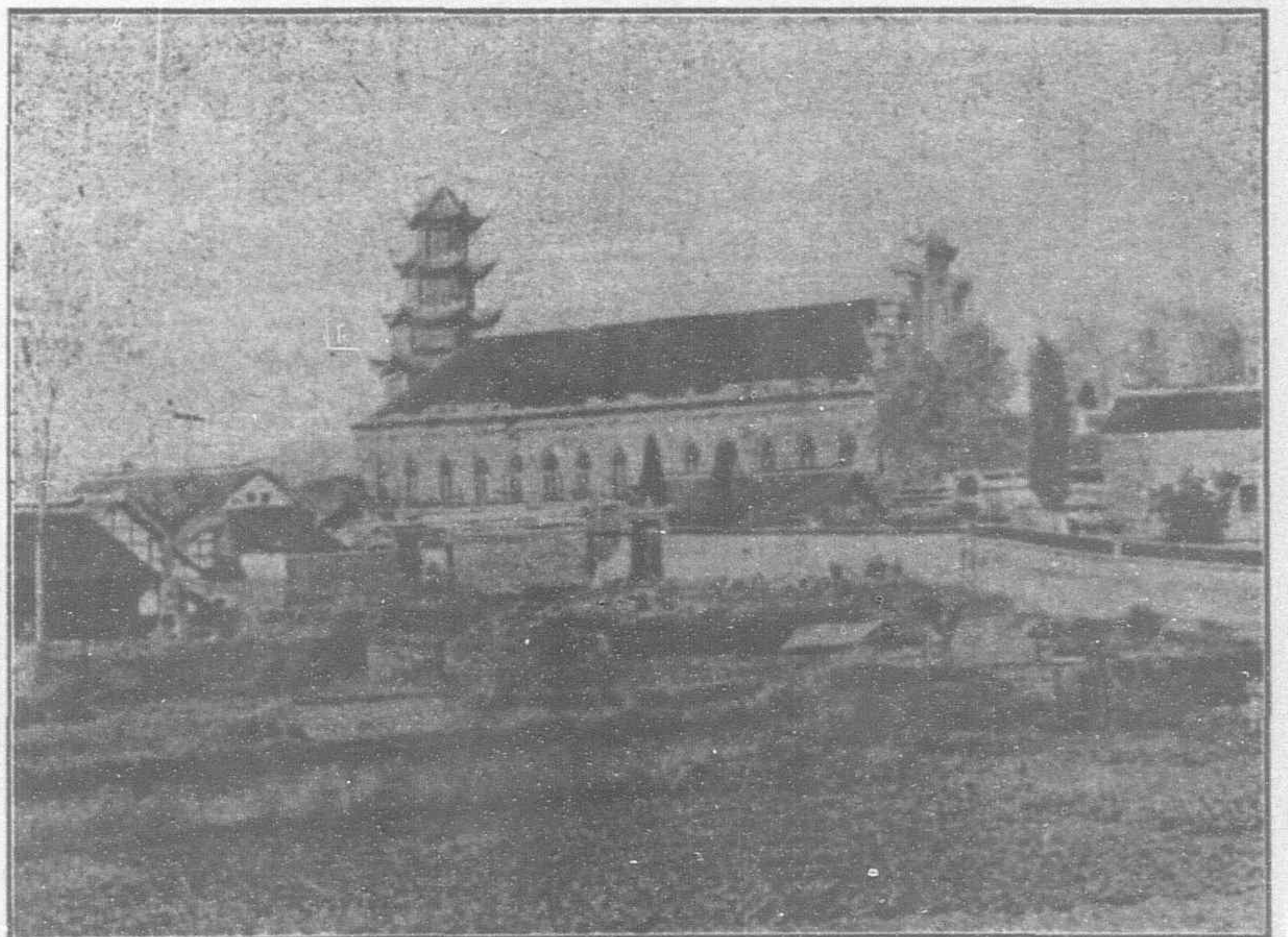
most notable increases shown in this trade in 1912 were by broad beans and wood oil, the former being shipped to England, Germany and Italy, where they are used for horse fodder. A considerable quantity of the crackers are said to find their way to America. Antimony is also exported largely though more regulus is being shipped than crude, the smelting fees thus being retained in the province. Hitherto the Huachang Smelting Company has had a monopoly of the manufacture of regulus, reports the Commissioner of Customs, and it has increased its capacity to about ten tons a day, and a further enlargement of the plant is contemplated. The establishment of two new smelting works in different parts of the province is contemplated, and is justified by the large deposits of ore. These deposits, probably larger than any other area of similar size in the world, when worked and refined, cannot have but a serious effect upon the antimony market. At the Shui Kou-shan mines zinc and lead ores are being produced to fill foreign orders, the mines, being the richest in the province. They were opened sixteen years ago and are solely under Chinese management, work being carried on under both western and Chinese methods. The mines are fully equipped with machinery and are connected with the river by about three miles of light railway. The ores are dressed at the mines, the zinc being mostly sold to the mint for about Taels 200 per ton. Lead is not produced, the smelting works which were established in the city being closed after a few months. The output for three months of 1912 is stated to be valued at Taels 5,000,000. With the exception of these mines there are probably no others working in the province according to modern methods, the main hindrance being want of capital. A great future is prophesied for tin, the metal exported being of excellent quality. The mines, however, are worked only by Chinese methods, and the pewter-ware for which the city is famous is made mostly from the product.

These few facts of the mineral possibilities under existing difficulties of communications indicate clearly enough what the future of the province would be if opened up by railways. Changsha is now dependent upon the waterways, which, however, give a service of immense value in developing the trade. During 1912 a total of 1,166 steam vessels, and 1,272 sailing vessels entered or cleared under "general regulations," while 6,040 entered and cleared under "inland steam navigation rules." The city is, however, destined to increase in importance by virtue of railway connections, for in addition to the line which will pass through it from Peking to Canton, and the one likely to be built from Shasi and Changteh, there is also one projected from Nanking, through Nanchang, the capital of Kiangsi, to Ping-siang, the line from which place already exists and brings coal from the mines that are working there.

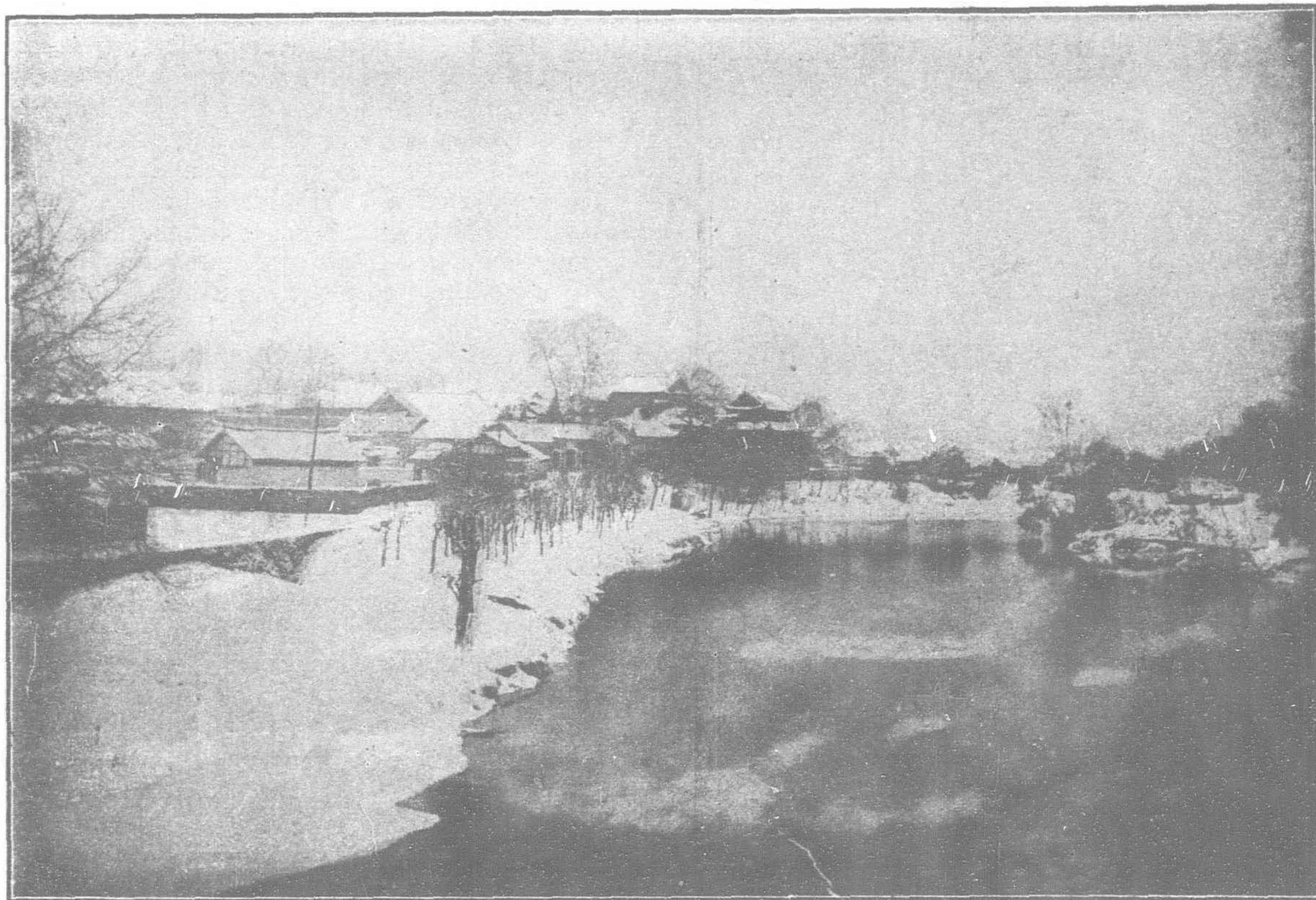
From Changteh the road to Kweichow follows the Yuan River valley, climbing past gorges of utmost picturesqueness, and traversing undulations which give marvellous views of rugged scenery, temples perched on craggy points, and the wild river roaring over rapids beneath—rapids which, however, deter not the toiling junkmen who pull their boats upstream, twenty to thirty men to a junk, in defiance of all natural obstacles. And so to Shenchowfu (455 feet above the sea) and to Yuanchow, —the point of junction of the roads from Canton, from the south-east of the province, and from the north-west—and on to Chenyuan, the head of navigation. Just before reaching this city a bridge of five or six arches spans the stream, and, combined with the rocky heights which surround the town, lends to the scene a distinct air of grandeur. The gorge passed through before Chenyuan opens to view is one of the most picturesque, as well as most difficult, on the river. To Shihping the road is ill-paved, marked by steep inclines and precipitous paths, though beyond Hsinchow it follows a high level, the valleys

below being cultivated by rice farmers. Coal is frequently outcropping, and evidences of iron abound. The depopulated nature of the province is responsible for fertile and beautiful valleys through which the road passes being practically deserted, though, as the capital is approached, the cities grow in size and the country is more cultivated. From Kweiting onwards the road traverses narrow ravines, with trees such as willows, oak, horse chestnut, ashes, and sycamores covering the lower slopes of the hills. Wild flowers grow in abundance and what the late Mr. Margary describes as "a paradise of ferns" is passed through. The last pass before Kweiyang is reached permits of a magnificent view and the city as it rests 3,527 feet above the sea on the uneven plain below. It is surrounded by high hills, many of which attain remarkable shapes and stand solitary in the plain. Viewed from the distance, with a wealth of green trees, suggestive of coolness and shade, the city looks inviting, but the traveller upon entrance finds it much as other cities in China—crumbling in the hands of time. Memorial arches of all shapes and sizes wrought out of white marble crowd the road to the city, and give eternal renown to pious maidens or steadfast widows.

The city is comparatively large and busy, the main thoroughfare running from the north to the south gate, and containing commodious and lofty shops offering a large variety of goods for sale. In the piece goods shops are to be found a large assortment of foreign and native cotton piece goods and plain and brocaded



French Catholic Church at Kweiyang



Winter scene at Kweiyangfu, Kweichow

silks. The Blackburn Mission reported that "trade generally was in a prosperous condition and the people prosperous, though enterprise was restricted owing to lack of capital."

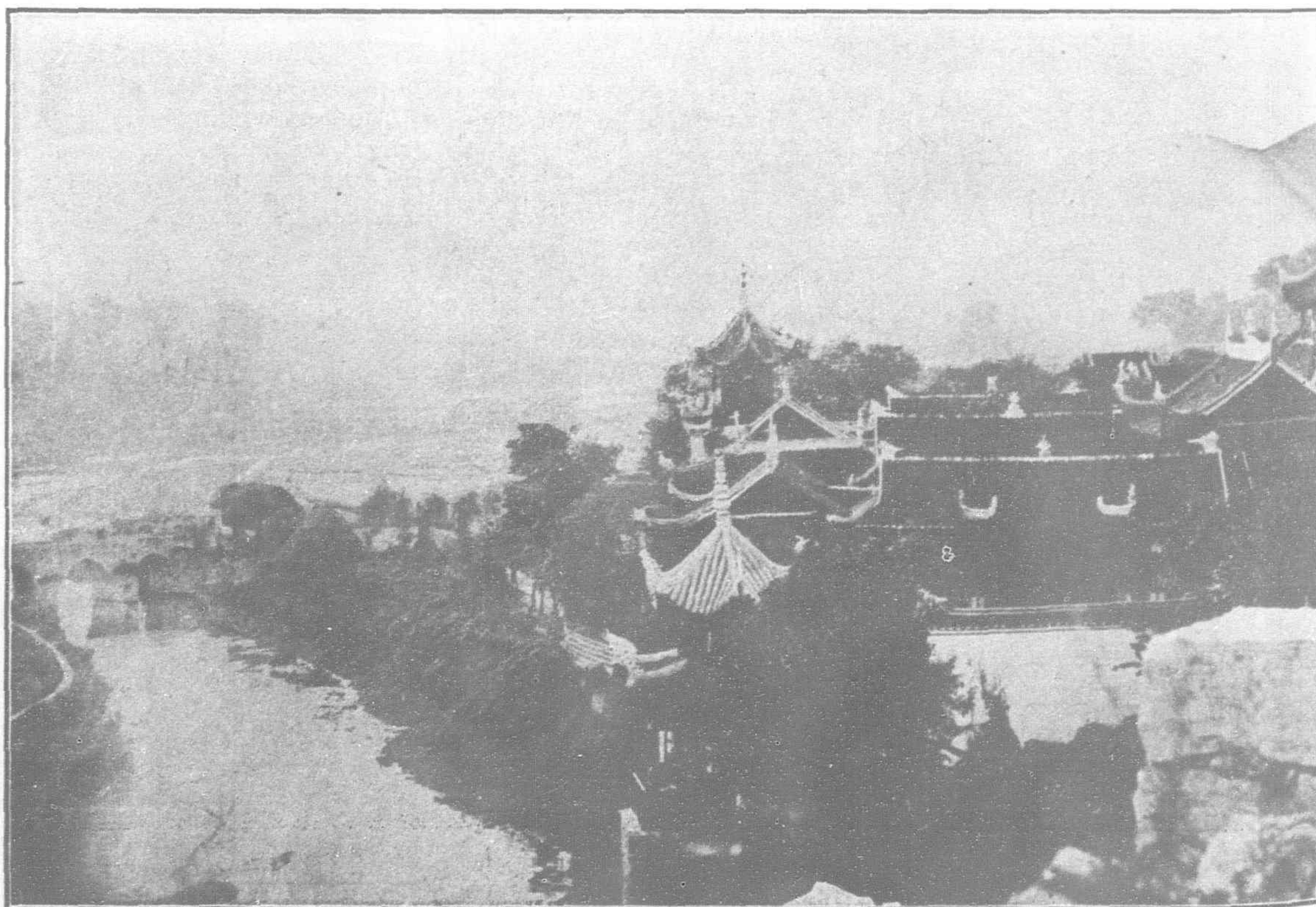
Coal is the fuel burned in the city the main supply coming from mines ten miles away to the west. Immediately outside of the city the road continues through cultivated tracts and through large areas of arable land unoccupied, but which, in former times, was intensely cultivated. The road ultimately winds among low hills of strange formation, passing a remarkable avenue of hills extending in a straight line north and paved for several miles with a perfectly flat and narrow strip of land between. There is, says Mr. Margary, a regular conclave of huge tumuli, which do not exceed 300 feet in height, in this region, the road threading its way between them to fine valleys which throw out long arms like estuaries. Grass covered plains are the feeding grounds for herds of tame buffaloes owned by the Maiotze tribes people, who live in the villages or on the hills.

Sixty-five miles from Kweiyangfu stands the walled city of Ashunfu, which is approached over undulating downy ground, and through a graveyard extending over two or three thousand acres on the east side of the city walls. Though small in size and population it is the centre of a prosperous trade, and is the second most important city in the province. The main street is well paved, and ornamented with memorial arches. Large shops contain ample and varied stocks of goods and merchandise, and there is an enormous and ever increasing demand for foreign yarn, the value annually imported greatly exceeding that of all other imports taken toge-

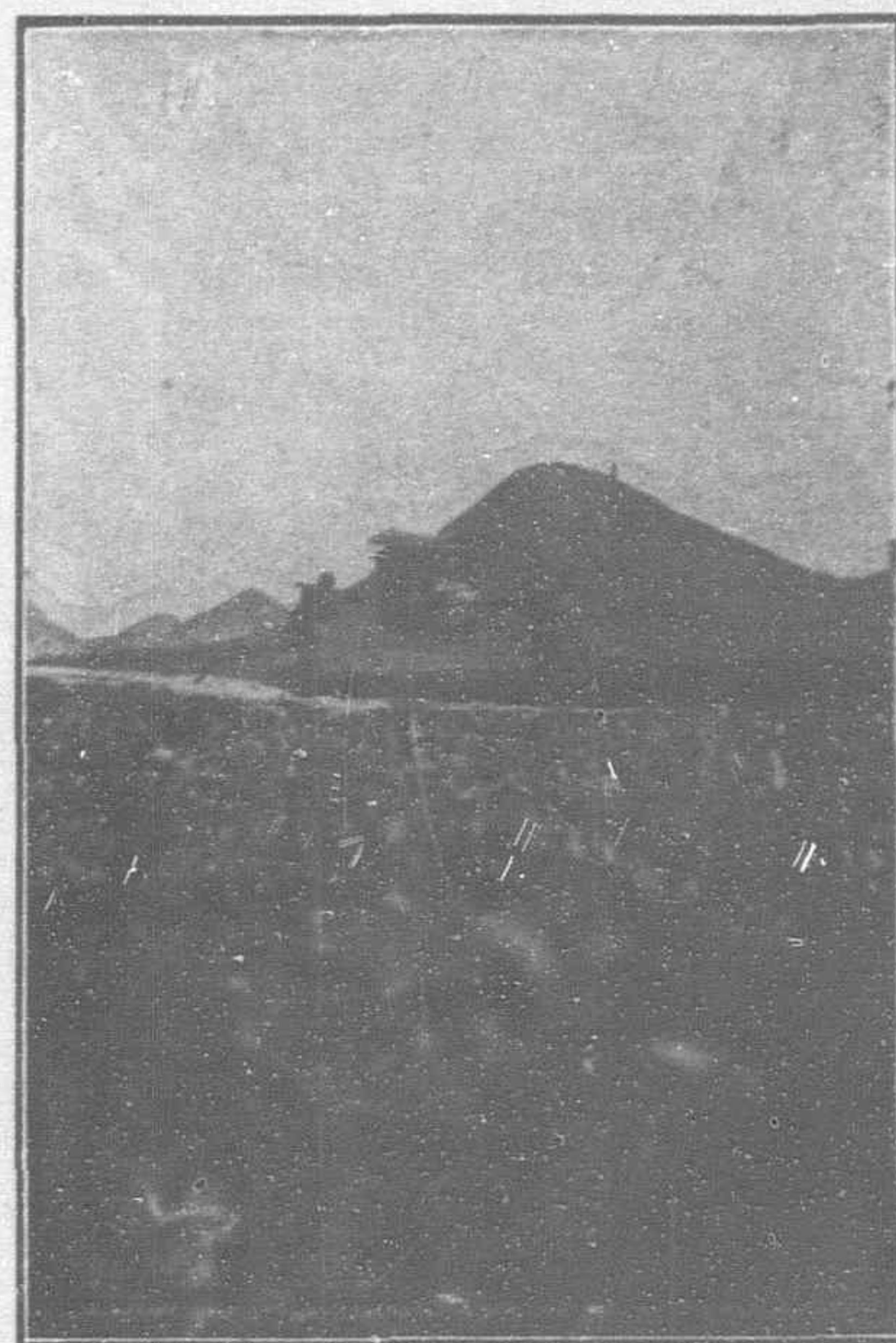
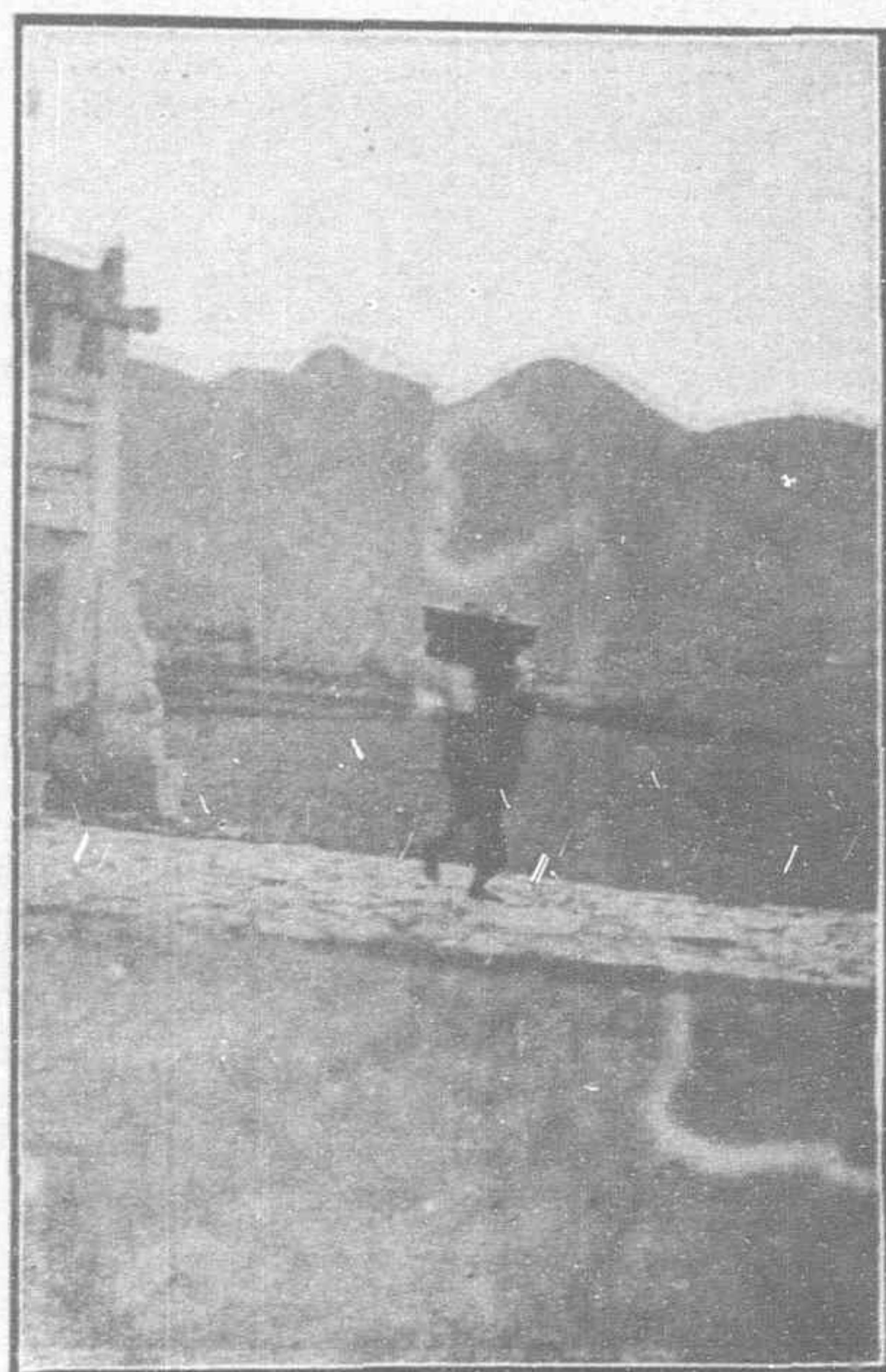
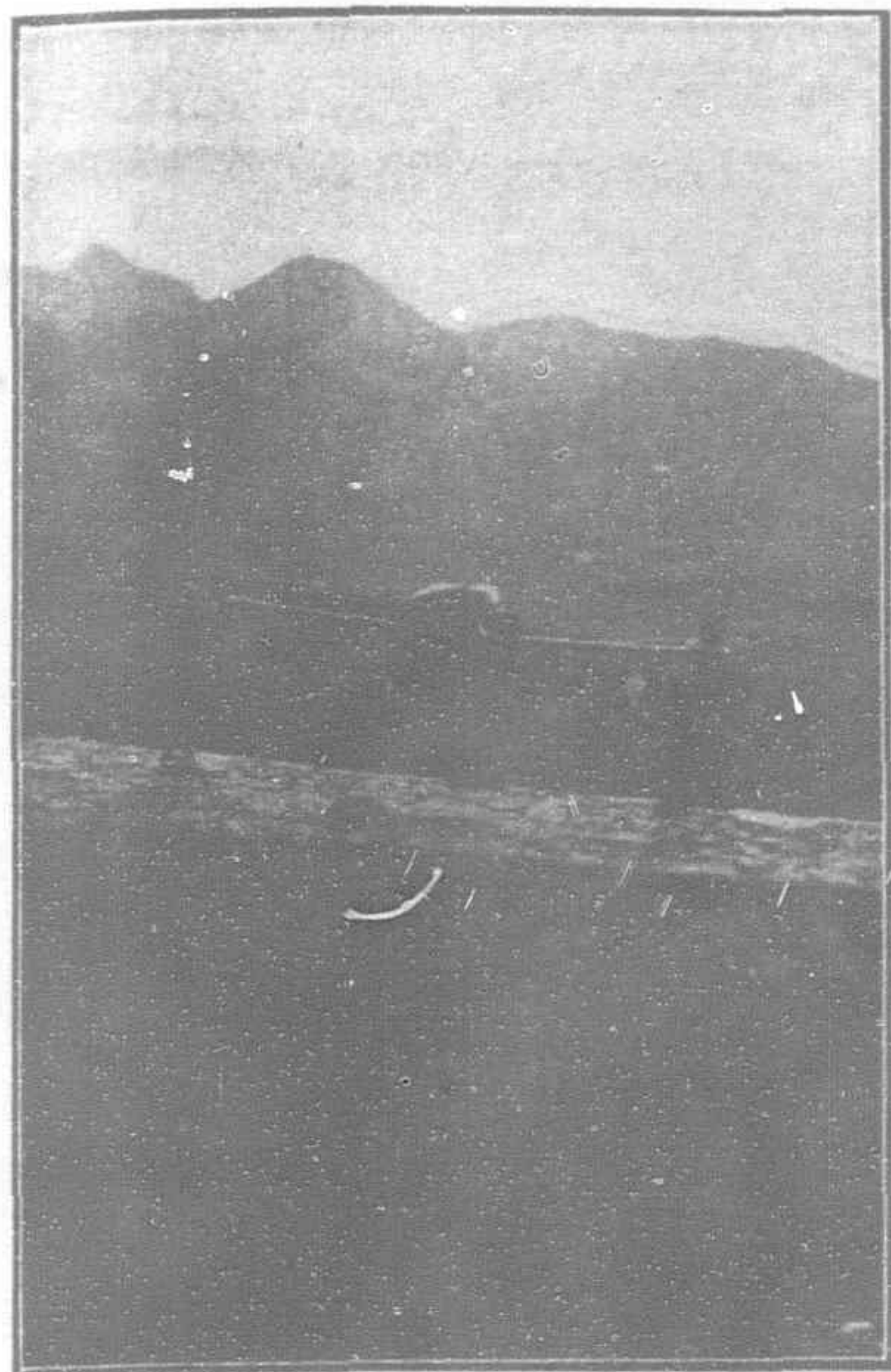
ther. The weaving industry is a large and profitable one. The city is also the province's centre for the white wax insect, bags and baskets containing the pupae of the insect being offered for sale.

The road goes westward through increasing cultivation, the valleys being broad and of rich soil. Mr. Margary writes at this stage, "one thinks Kweichow an impenetrable mass of mountains, but it was most remarkable to find it possessed of many fine plains lying in the right direction." Five miles from Chenning the broad valley ends and a smaller one is entered over an easy pass, and extends for about three miles when the road again runs sinuously between grass covered hills, soon to meet with a rocky mountain barrier. Near Hwang-kwe, the river leaps over a precipice 140 feet high, and beyond the road ascends and descends, "but even in the midst of this mountain mass, where the rocky cones were tossed and tumbled like a stormy sea, there was a succession of quiet

valleys down below lying flat at the bases of these abrupt boundaries" Near here the road to Shingyi leaves the main route to Yunnan and enters difficult country. A deep cleft is crossed, with more ascents, and the road descends into a canyon of desperate appearance by a precipitous path. The turbulent river rushes between high vertical precipices which almost shut out the light till it disappears into what looks like "the dark entrance to the nether world," as the report of the Blackburn Mission puts it. A stiff climb of 2,400 feet then takes place, and within a few miles a similar descent is made with a gradual rise to Taipingkai. From here on to Shingyi (or Wang-tsca-pa as it used to be called) the country is more conducive to ease and comfort, the route



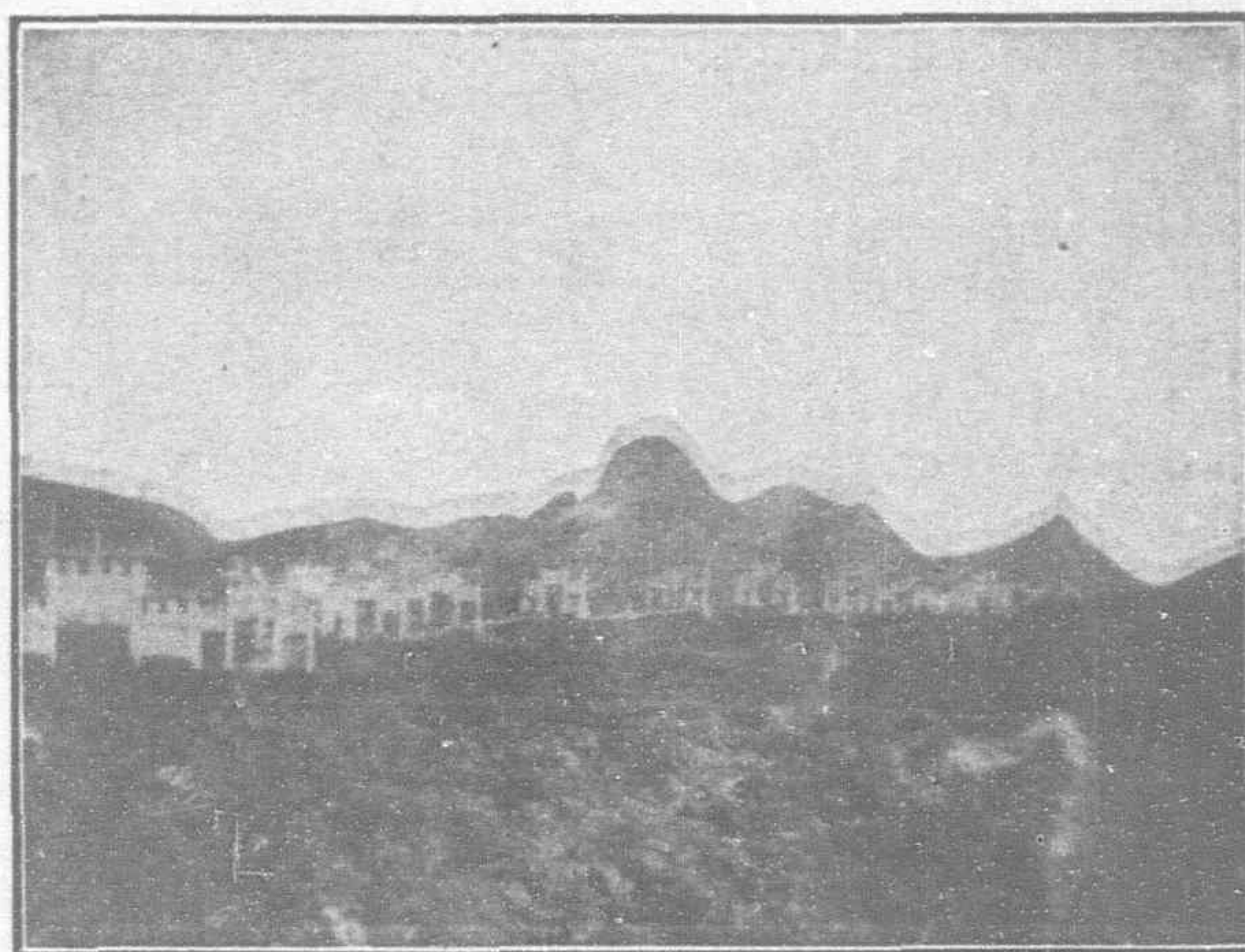
Outside the West Gate of Kweiyangfu, Kweichow. The Shanyuan Temple, and road towards Anshunfu



Transport in Kweichow Province: on the Kweiyang Road



Miao Women Porters, Kweichow



The Approach to Kweiyangfu, Kweichow



A Salt Market in a Kweichow Town

traversing narrow valleys amongst limestone hills, profusely covered with flowers, shrubs, and particularly radiant roses. This is on what the natives call the yellow grass plateau, of which Shingyi is the market town. The valley in which Shingyi is situated is well irrigated and boasts of an enterprising population, who devote untiring energy to cultivation and irrigation.

Shingyi is remarkable for the large quantity of Indian yarn that is imported annually, and the quantity of cloth which is produced in the town and neighborhood from the yarn. It is estimated that from 1,000 bales of 400 lbs. are sold every year and that from 2,000 to 3,000 looms are engaged in weaving various grades of narrow cloths from this yarn and native cotton. The greater part of the yarn is bought in Hongkong and shipped by way of the West River through Poseh, from which place it is carried on pack animals, taking twelve stages of an average of 30 miles a stage, to accomplish the journey. Shingyi is the objective of the railway from the Yangtze, and at this point it is expected that the line which has been allotted to the Banque Industrielle de Chine to build from Yamchow, on the coast, to Yunnanfu and beyond, will pass, and so permit of a junction which will give access to Yunnanfu to passengers and freight travelling from the Yangtze regions or from Kweichow province.

Mr. F. S. A. Bourne, in his report of the Blackburn Mission, says of Kweichow that it is "richer in agriculture, and I believe in minerals also, than eastern Yunnan. The bedrock is almost everywhere limestone, making beautiful scenery and a healthy climate; there is little or no malaria. The altitude gradually sinks from 5,000 feet in the west to



KWEIYANG, CAPITAL OF KWEICHOW.

1,500 feet on the eastern side of the province—the Hunan border. It is not as badly cut up by water as Yunnan, where every stream has made itself a deep canyon, but consists for the greater part of narrow valleys between limestone hills, a stream running down the bottom, perhaps a little terrace cultivation near the stream, but the hillsides given up to ferns and flowering shrubs, which grow in the greatest luxuriance, or, if the valley is some way from a town, covered with trees, not heavy timber, but fire, bamboos and fruit trees; pheasants are calling and water splashing—an earthly paradise. To this natural beauty the works of man present a melancholy contrast."

[Note.—The latest information suggests that the American section of the Hukuang Lines beyond Ichang will be extremely difficult and costly and will take many years to build. Until the American section is built the line from the Peking-Hankow Railway to Ichang would be of no service in tapping the trade of Szechuan, the main justification for its construction. In any case the branch line to Siangyang would be built and, as stated elsewhere, Herr Linow, the Engineer-in-chief of the German section has recommended that it should be undertaken first. Some doubt has been expressed as to whether the American section will ever be

built, as the French line from Chungking to the Gulf of Tonkin, if built, would attract the trade. It is calculated that the British and American sections of the Hukuang lines will cost about £8,000,000 each, while full amount of the Hukuang Loan is only £10,000,000.]

ARCHITECTURE IN THE CHINESE CAPITAL

THE SUPREME COURT OF JUSTICE

The Taliyuan, or Supreme Court of Justice, which was recently opened for public business forms another important addition to the few existing government buildings in Peking designed in foreign style. Situated in the Hsin Pu Chi Street in the Western Quarter of the Tartar City, the building is of some considerable extent, having a frontage to Hsin Pu Chi Street of 450 feet, and a depth of approximately 150 feet. Being four storeys in height, it stands out prominently from the immediate surroundings.

The building is designed in a free treatment of the English Renaissance style of architecture, and being set back close on 150 feet from the roadway, it has a decidedly handsome and attractive appearance.

The façade to the street has a rusticated ground floor storey, and two floors above marked by an Ionic colonnade, the whole being

crowned by a balustraded parapet. The central feature of the façade is the clock tower, which rises to a height of 110 feet, while at either end of the front there are smaller towers rising to a height of 90 feet. Each of these towers has a dome top, which is covered with copper. The building throughout is built of local made brick, the whole frontage, and the return faces of the corner towers being finished off in cement plaster, while the remainder of the elevations is faced with blue bricks having bands of red brickwork at the sill and lintel courses as well as in the pilasters. The roofs are covered with red tiles also of local make. In the centre of the building are two large courtyards, each measuring 155 feet by 55 feet, thus ensuring plenty of light and ventilation throughout all the rooms in the building.

Access will be obtained from the roadway through two handsome wrought iron gateways, set back some distance from the front boundary, and on either side of the forecourts to same, there will be erected two small gate lodges.

The principal entrance to the building is in the centre of the façade under the clock tower, while there are also other entrances in the front

elevation to the right and left of the main entrance, as well as on the side and back elevations, all of which give easy and immediate access to any part of the building. Entering under the clock tower and passing through a vestibule and outer hall, the main entrance opens out into a fine staircase hall, out of which rise the two principal staircases giving access to the upper floors.

The accommodation on the ground floor, on the South side of the building, comprises two large criminal courts, each having in suite judges' rooms, consulting rooms, retiring rooms, and numerous rooms for witnesses and servants. On the North side are two large civil courts with accommodation similar to that for the criminal courts. In addition there is accommodation provided for the law library, secretaries' offices, retiring rooms, enquiry offices, despatch rooms, attorneys' rooms, reporters' rooms, reception rooms, telephone rooms and servants' rooms, while there is ample lavatory accommodation.

On the first floor the principal apartment is the Supreme Court, adjacent to which are suites of rooms for the Chief Justice, the Attorney General, the Judges, the Chief of the Court, and their respective secretaries. On this floor also, there is a large civil court, a general meeting hall and reception room, rooms for the secretaries, a large reading room, and numerous retiring rooms, as well as rooms for witnesses and servants, and ample lavatory accommodation.

On the second floor, there are fifteen suites of three large rooms each, forming offices for the various branches of the courts work.

In the basement, accommodation will be provided for the heating plant, electrical plant, kitchens, servants, etc., and in addition there is large storage space. In the upper part of the central tower provision is made for a clock, with 8 feet diameter dials facing all four ways, and a large bell, both of which should be of great service to the inhabitants of the Western quarter of Peking.

The whole of the sanitary fittings, and the plumbing and drainage work will be carried out in accordance with the latest improvements in sanitary science, the septic tank system being installed for the treatment of the sewage.

The buildings throughout are heated by steam on the low pressure system, with radiators in the principal rooms and corridors, while an electric light and electric bell installation and a telephone system have also been installed.

Messrs. A. H. Jaques and Coy., Builders and Contractors, of Tientsin and Peking, are the general contractors for the whole of the works on the building, which has been designed and erected under the superintendence of Messrs. Atkinson and Dallas Ltd., Civil Engineers and Architects, 4 Legation Street, Peking.

THE CHINA MERCHANTS COMPANY

The China Merchants, Steam Navigation Company recently decided upon an increase of capital. Originally the company's capital was Tls. 2,000,000, and some years ago this was increased to Tls. 4,000,000. The latest proposal, however, was to increase the capital to no less a sum than Tls. 16,000,000, and to pass this proposal a meeting of shareholders was held. Mr. Wong Tse-chin, Chairman of the Board of Directors, presided, and submitted a report on the proposed resolution. In the course of his remarks he stated that since the revolution of 1911 many comments had

been made in regard to the working of the company, and a suggestion had been made to wind it up. That this was not desirable was evident from the fact that the company's working had been quite successful, and a recent valuation showed that the company's assets were worth something like Tls. 16,000,000 as compared with its capital of a quarter that amount.

Mr. Shen Tun-ho spoke in support of the recent valuation and a resolution was ultimately adopted for an increase of capital to the amount stated. This will necessitate a further increase of shares, but no additional money will be required.

ELECTRIC LIGHTING IN MANCHURIA

The South Manchuria Railway maintains electric lighting plants at Dairen, Mukden, Changchun, Anlung, and Liaoyang, and holds a controlling interest in the

lighting plant at Newchwang, which is operated in connection with the waterworks establishment at that port. All of these institutions seem to be giving fair business returns. Supplementary equipment, increasing the capacity by 1,500 kilowatts, has recently been added to the Dairen plant. The capacity of the lighting establishments at Antung and Changchun is also being increased, and an additional generator will be installed at the Liaoyang plant in the near future. The construction of an electric tramway and the enlargement of the railway lighting plant at Mukden are under discussion, but negotiations with the Chinese authorities have made little headway.

Recent statistics of lighting plants located at main points along the railway give the number of households in which current has been installed as follows: Dairen, 6,600; Mukden, 1,200; Changchun, 1,200; and Antung, 1,250. Meters are installed only where five or more lamps are in use and the figures show that 32,000 lamps are supplied by meter in Dairen, 2,300 at Mukden, 3,400 at Changchun, and 2,600 at Antung. Lamps supplied by monthly contract number 16,000 at Dairen, 4,500 at Mukden, 3,800 at Changchun, and 3,600 at Antung.

LUMBER IN THE PHILIPPINES

The hardwood lumber industry in the Philippines will receive a new stimulus when the riches of the Caramuan peninsula will be put on the

market after the contemplated exploration and survey has been completed, says the *Manila Daily Bulletin* of February 5, and continues:—

A survey and exploration party will be sent at the end of this month to commence work on Caramuan peninsula, one of the most heavily timbered sections of the islands and will report the exact conditions to the bureau of forestry.

The peninsula, which is situated between San Miguel bay and Lagonoy gulf, has great harbor facilities: two good harbors are known at present. The geodetic survey will cooperate with the party in locating all additional ports which can be made available for lumber shipping.

Several inquiries by lumbermen have already been made about the section in question and as soon as the respective data is compiled bids for the forest products will be asked for.



The Taliyuan, or Supreme Court of Justice at Peking

JAPAN STEEL WORKS

Mr. Takasaki, ex-Governor of Osaka, has assumed the presidency of the Japan steel works as a result of mutual arrangement among directors, and is introducing innovations into the business proceedings of the works. In this context he is represented to have said that the losses sustained by the works since their inauguration have amounted to more than 600,000 yen. The first duty to be filled by the new directorate is to place the concern on a much more workable basis and make the business a paying one. That the object may be attained the proceedings in the works must be made more businesslike and operations must be conducted on a much more extended scale. At the same time the running expenses must be reduced as much as possible. As a first step towards this end, three high-salaried officials, whose duty it was to superintend the general management of the concern, were relieved of office, and other measures of reform are soon to follow.

THE ARC WELDING PROCESS

The art of welding metals is one which has undergone considerable revolution in recent years, there being, as is well known, several processes at the disposal of Engineers, Boiler Makers, Ship Builders, and others to-day.

The system which appears to be making the most headway just now, is, it can hardly be denied, that of Welding by the Electric Arc.

Like so many other changes in a particular art of industry, the arc welding process has introduced a considerable demand for a special engine and dynamo. The introduction of a Welding Plant compels attention to the essentials for success, namely, close governing, efficient cooling, full power running qualities, perfect vapourisation of paraffin, and so on in the engine, together with a dynamo which is specially wound for the sudden fluctuations.



Another View of the Supreme Court of Justice at Peking

The public regard the prospects for the works with anything but glowing hopes, believing that the works have suffered and will continue to suffer from the competition of Messrs. Armstrong and Vickers and the hostile attitude of the Mitsui Bussan Kaisha, the agent in Japan for the British concern. The new president of the works refuses to acknowledge the existence of these disadvantages, declaring that the idea of those foreign and domestic companies interfering with the business of the works was only ridiculous, considering those concerns are the actual proprietors of the works. He, however, recognizes the fact that the only preventive against the much-feared competition is the difference existing between the ability and efficiency of British workmen and those of Japanese and the geographical positions of the respective works.

Though the works at Muroran have been planned on a large scale still, in the opinion of the new officials, their accommodations are very defective and that is at least one of the chief reasons for the unsatisfactory results having so far attended the business. Therefore it is proposed that as soon as the resources grow sufficient to stand it the extension of the works should be effected.

It is a case of either full load or no load instantly with such a plant as this, and one of the firms who have been most successful with their engines for this work is the Parsons Motor Coy., Ltd., of Southampton, who we understand have just booked orders for no less than five more of their engines for this work.

They have already nearly a dozen firms using their engines most successfully, and seeing the care and attention with which they have devoted themselves to the problems connected with this development, they appear to have fully merited the orders going to them.

Mr. Fank L. Crone, Director of Education in the Philippines, has resigned.

Professor Goodnow, Adviser on Constitutional Law, has accepted the Presidency of the Johns Hopkins University, and has been permitted to curtail his engagement with the Chinese Government.

THE OIL FIELDS OF NORTH CHINA

CHINESE GOVERNMENT AND STANDARD OIL COMPANY COMBINE FOR EXPLOITATION

For months past rumours have been rife in regard to "deals" giving foreign interests the right to exploit the oil fields of Shensi and Chihli. Of these the most important in Shensi are in the Yenchang and surrounding districts. The total oil-producing area in the province is said to be 2,100 square li, and the oil from the Yenchang district is of the best quality. In Chihli the oil fields are in the district of Chienchang. At one time it was said that in consideration of a loan or payment running into high figures—\$70,000,000 was mentioned—the Standard Oil Company was to obtain a concession to operate these fields. At another it was said that the interests, represented by the Rising Sun Oil Company, had, in the words of the *China Tribune*, a well informed Japanese paper published at Tientsin, given "a warning to the Chinese Government and tried with all its might to nullify the acquired rights of its rival concern (the Standard Oil Company). The efforts of the Rising Sun Company proving quite successful, the Chinese Government is considering to work the extensive oil field in co-operation with it. It is said that a battle of concessions is merrily going on between the three parties concerned." This was written in September, 1913, and, no doubt, represented the position as it then existed with sufficient accuracy. But the Rising Sun Company did not sweep the "rival concern" out of its path, and it was later reported that the Sino-Japanese Corporation originally started by Dr. Sun Yat-sen and others, would obtain the concession. Colour was lent to this report by the visit of one of the prominent officials of the Corporation to Peking. However, this report also proved to be based upon an unsubstantial foundation, and it was not until February 13 that any really definite news about the future of these highly prized and valuable oil fields became available. It was then announced that an agreement had been reached between the Standard Oil Company and the Chinese Government for the exploitation of the Shensi and other North China oil fields by a Sino-American Company. In this concern the Standard Oil Company was to hold at least 55 per cent. of the shares, thus securing a controlling interest. The information made available at first was rather meagre. For reasons which no doubt were deemed to be quite sufficient, the Government thought it unnecessary to make public the exact nature of the arrangement that had been made. It was inevitable that some opposition would be presented to any scheme to develop China's oil resources—it is always possible, unhappily, in China, for an agitation to be worked up against any proposed foreign co-operation in the development of the country's mineral resources. This secrecy enjoined by the Chinese Government was ill advised, as an agitation, mainly based upon ignorance of the real nature of the Agreement, began to assume serious proportions. It was then deemed advisable to publish the terms in order to make it clear that in this instance China had made a remarkably good bargain.

It is stated in the Agreement that the interest in the Sino-American Company to be given to the Chinese Government will be 37.5 per cent. of the share capital, with the option for two years, of taking up another 7.5 per cent. There is a proviso that the formation of the Sino-American Company is dependent upon proof being obtained that the oil fields are of sufficient value to be worth exploiting, and it is understood that a staff of experts is now *en route* from America to settle this point. The Chinese Government is also to receive a royalty of 1.5 per cent. The Sino-American Company, if formed, will have the exclusive right to work the oilfields for sixty years, and no other concession of oilfields in China is to be made to other persons for one year. One-twentieth of the total output is to go to the Chinese Government free of cost.

That the Shensi oil fields are of enormous value is almost beyond question, though little data is available. The well known experts Professor Engler and Hoeffler in a report published in 1911 said:

"On the South of the desert Gobi, at the base of the Nanchang Mountains in the province of Kansuh, at a distance of 20 miles from Schangte-King-pou, near the River Tsche King-sia, are situated petroleum rocks. About a dozen wells, 3 ft. deep, are separated by an enclosure. Four families, descendants of the discoverers of the bearing, have the authorisation of collecting the oil, which daily accumulates on the surface of the water. Out of the total quantity of petroleum they have to pay the State 500 gallons, and contribute to the illumination of the pagodas 100 gallons a day, and the rest is their exclusive property. The oil is used as lubricating oil, or, after it has been submitted to a summary cleaning, as an illuminant. In the province of Shensi, at a distance of about 100 miles to the south-west from the missionary station Hsiaotschao and the town of Ning-taio-liang, petroleum rocks are situated in a mountainous district. Rivulets of petroleum are there, descending from great heights from red rocks and sands. The oil is of a greenish colour and very fluid, and is used, as an illuminant. In the yellow tertiary layer, 104 to 300 ft. deep, the honggay (reed) sand, the qua-hong-gay (grey) limestone, the honag-kiang-gay (orange) onthic iron, then the bituminous strata at a depth of 600 ft., then the fsao-pe-gay (white salt); then at a depth of 810 ft. the gas strata; then, again, tsin-tsche gay (grey blush) strata, forming marls; and finally, the petsch-gay (white) strata, corresponding to the permien limestone. At this depth of 990 to 1,800 ft. there is salt water in yellow layers, then mey-tau-gay, limestone and coal, the ma-kou-gay (brilliant green), corresponding to silurians, the he-you-gay (Cambrien). Below 2,790 ft. there are salt waters and large quantities of gas. Most of the borings at Tse-lin-tsin are at this depth. Petroleum is found some times before reaching the marl and shale formations, the salt water before reaching the coal. The gas is found above coal, the richest parts being in the passing strata; coming from this level it burns with a blue or yellow flame, and when found above the level with white flame. It often comes out under very high pressure, and with tremendous explosions. The crude oil is of various colours; the best is nearly water white, and is used exclusively as an illuminant for lamps. The yellowish and greenish oils are as well used for illuminating, while the black viscous oil as lubricant. The Chinese do not refine their petroleum, but sell it on the spot at prices varying from f.o.;33 to f.o.41 per kilo. The number of petroleum sources in the district is from 30 to 40, and in the whole province about 50. In the district of Pen-Tsi-hsien (province Tung Chuan-Fu) there is a company formed for the purpose of petroleum exploitation. The oil obtained by the company is heavy and cannot be used for illuminating purposes without being refined. L. de Loezil, an explorer of China reports that oil of excellent quality is found at Futschau-fu, on the River Min-ho. The district Min-ho shows all the signs of being rich in petroleum."

Earlier in the same year Mr. J. H. Arnold, United States Consul at Amoy, in a report on petroleum in China said:—

"The supply is said to be inexhaustible. The refined oil is transported over rough cart roads 200 miles to Sianfu, where it is sold in open market for the equivalent of 30 cents United States currency a gallon, competing with foreign kerosene, which sells for 43 cents a gallon. The larger cities throughout Central Shensi are being supplied with the products of the wells of Northern Shensi. The company is considering the construction of a light railway from Yenchang to Sianfu, as transportation by cart costs them at least 5 cents United States gold per ton-mile."

Another report, issued in 1908, said:—

"There is no reason to doubt that the reports of valuable oil measures in the western parts of China are not founded on a very solid substratum of fact. The Trans-Caucasian oilfield belongs to a large region, geologically homogeneous, extending from the Crimea, in the northwest along both sides of the Caucasus and along the northern frontier of Persia to Merv and Sarakhs in the south-east, a region in which petroleum is known to exist at many points and there appears to be no reason why this oil area should not, like the geological area, extend into the confines of Chinese Turkestan and to the Provinces of Kansuh and Shensi. Similar argument might with justice be applied to the province of Szechuan and to some parts of Yunnan. The oilfields of Burma are famous, and before the discovery of the oil areas of the United States afforded no considerable share of the world's supply. The geological structure of Burma and the provinces of Szechuan and Yunnan are very similar, and in some senses continuous, so that the probability of abundant oil bearing areas in these provinces is very high. The presumption is thus in favour of the possibility of extensive oil resources in China, and the economic changes which the realization of this possibility would bring about are enormous. With the exception of the American boycott period the importation of kerosene oil has during the last four years been slightly above or slightly below 160,000,000 gallons, with a value of from nineteen to twenty-seven million Haikuan Taels. The bulk of this import was from the United States, and of the remainder the Dutch India and the European Ports of Russia supplied about equal portions."

The exploitation of China's mineral oil wealth would make rapid inroads upon this trade. The cheapness of Chinese labour would enable an oil bearing district properly equipped with modern appliances to undersell both the Russian and the American producers. The great difficulty lying in the way of the Chinese trade would be that of transportation. For tank movements the necessary railway accommodation is not yet provided; nor is it likely that an enterprise in its initial stages would be able to carry out pipe line distribution on any large scale, even if the number of local official bodies with powers to hamper and restrict such an enterprise were much smaller than at present it is. The initial transportation difficulty once overcome would open the way to an enormous trade. The use of kerosene is by this time well-nigh universal in China and China herself would be the first consumer of her own products. Facilities for transportation from Chinese Turkestan westward are increasing yearly, under Russian auspices, and the possibility of rivalry between the Chinese product and the product of the adjoining Russian fields suggests itself."

There have been spasmodic efforts on the part of the Chinese to arrange to work the Shensi fields on a large scale themselves. In October, 1908, H.E. En Shou, the Governor of Shensi recommended to the Throne that in view of the discovery of rich deposits in the district of Yenchang in that province, the Government should obtain an interest in them by advancing a portion of the Capital needed by the merchants and people who were in possession of the land containing the petroleum. An Imperial Rescript was issued authorizing the Ministry of Posts and Communications to advance the sum of Tls 2,000,000 to the oil company then being organized to exploit the wells. In consideration of the advance it was to be the privilege of the Ministry in question to appoint the principal officers of the new Company.

The matter was dropped and in 1910 it was announced that a company had been formed with a capital of six million Kuping taels to work the fields. Like so many similar undertakings this company does not appear to have emerged far from the phase of discussion, and the fields are still worked in a most primitive

manner. Some of the Chinese companies operating engaged Japanese experts to supervise the work, and this is apparently the ground upon which the Japanese claim to a concession is built.

Other considerations apart it will undoubtedly be an excellent thing if a start be made to develop China's oil resources. The actual monetary return from the shares in the operating Company will be the least part of the advantage China will gain. The establishment of a huge industry, giving employment to thousands will mean the circulation of a large sum of money and will enormously benefit Shensi in particular and China in general. The Chinese Government gets 37½ per cent. of the stock and subsequent profits for nothing, and can purchase another 7½ per cent, thus securing an interest amounting to 45 per cent. The invaluable advantage is gained of having fields developed by the largest concern of its kind in the world, whose experience, organisation and equipment are made available free of cost. China, if the expression be pardoned, is in a "heads I win tails you lose" position. If the oilfields prove after prospecting not to be worth working on a large scale, half the out-of-pocket expenses will fall upon the Standard Oil Company. If, on the other hand, they are worth developing the Standard Oil Company will provide the experts and equip the fields with the most modern plant. From a provincial point of view the expenditure for the installation of refineries, pipe-lines, etc., will be of great benefit to the residents of the districts concerned. The arrangement between the Chinese Government and the Standard Oil Company will be of particular interest to the Shell group in view of the rate war which began in 1910.

On page 374 we give a translation of the Chinese text of the Agreement between the Government and the Standard Oil Company.

THE MANILA CAPITOL BUILDINGS

As a last bequest to the people of the Philippine islands, William E. Parsons, the consulting architect, will leave the completed plans for the capitol group which is to face the new Luneta in the Manila beautiful of the future, says the *Manila Daily Bulletin*, and continues:

Slight modification of the Burnham plans have been found necessary in carrying out the plan for the administration group, but the general ideas of that artist have been followed wherever practicable. The contemplated arrangement of the various buildings according to the plan of Mr. Parsons has been depicted in miniature model by the well known woodcarver, Juan Tampinco.

The model shows the entire section to be covered by the proposed structures and the new Luneta, a district extending from the waterfront back as far as calle Nozaleda, upon which one group of the buildings will front. Directly back of the position occupied by the Kizal monument, will be the great court of honor, in the center of which a large lagoon is set within a border of tropical trees. At the foot of the lagoon is the entrance to the capital building, while on each side of the lake are located the buildings which will house the various bureaus of the insular government.

Directly behind the proposed capitol is calle Nozaleda, and on its further side is a small plaza, semi-circular in shape, into which face the buildings which will be occupied by the supreme court and the various branches of the legislature. The proposed library building will occupy the site now filled by the bureau of education building for the present Philippine exposition.

The plans for the capitol building are absolutely complete, and the working prints could be prepared on short notice. The cost of this building is estimated at P. 1,650,000. The entire group will cost approximately P. 15,000,000, according to the estimates of the architect's office.

The present shortage of funds which appears to be facing the government will in all probability prohibit the construction of the buildings during the present year, but it is understood that work will be begun upon those which appear to be most essential as soon as there be money available for the work. The Philippine library and buildings for the legislature will probably be started first.

MODERN PAPER MILL AT KONGMOON

Writing from Canton on January 22nd, M. Reynaud of the French Consulate says: After a standstill of two years occasioned by the Revolution, the industrial development of the Cantonese region, mentioned in a number of reports previously sent from this Consulate, enters into a new phase of activity, owing to the prospects of peace and order under the new provincial government.

The latest manifestation of this industrial activity has been the recent putting into operation of a modern paper mill at Kongmoon, the open port situated at the mouth of the West River on the great commercial route from Hongkong to Kwangsi.

The capital of this paper mill, fixed provisionally at \$300,000, is exclusively Chinese; a part has been subscribed by the Chinese emigrants residing in the United States. The director of the workshop is a Chinese engineer graduated from the school of arts and trades at Tokyo.

The installation has been made under the direction of a Japanese company, which, by a precedent much practised in the commercial centres of this country, has thought right to put on the machines as they were being set up, a Japanese mark. But, in reality, all the workshop material comes from Germany.

According to the first tests, the production of the mill stands at present at about fifteen tons of paper per week.

The raw materials used for this paper mill are old rags and rice stalks; the paper produced has given entire satisfaction to the promoters of the enterprise, and the quality is good.

The future prospects of this new industrial enterprise are excellent. On the one hand, it is sure to find in unlimited quantities the raw materials which are used, and at prices given for paper in this country, it will reap good profits. On the other hand, it has the advantage of a very important and very frequented route by water which will permit the reception of raw materials and enable the products to be very cheaply distributed.

Finally, and this is the principal argument in favour of the success which can be predicted for this enterprise, the consumption of paper has developed so at Canton and in the principal towns of the Delta, that the products of the local industry, aided by the cheapness of the raw material and labour, will not fail to oust the foreign importations which up to the present has furnished almost all the paper, which can now be manufactured in the workshop of Kongmoon.

Some figures will be useful to justify the importance of this last argument, which show clearly the chances of success the modern paper industry in Kwangtung possesses.

In the course of the last three years the value of paper imported, principally from Germany and from Sweden, in the principal open ports of the Cantonese delta has been as follows:—

1910 ...	2,580,620 francs
1911 ...	3,263,700 "
1912 ...	3,708,410 "

This rapid increase in the consumption of paper is due mostly to the increase of the number of periodical journals and reviews published at Canton.

The conclusion is easily formed on this evidence that industrial enterprises like that which is organised at Kongmoon, have before them a splendid future and the success of this last will shortly lead to the creation of similar mills. The abundance of the raw material, the facility of communication by water and the cheapness of labour, will permit of advantageous competition by these with the importations of foreign paper.

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RAILWAY DEVELOPMENT OF WESTERN CHINA

BY ARTHUR J. MOORE-BENNETT.

Whilst in the balance of China, the railways so far projected, are for the most part designed to help China open up her vast mineral and other resources, here in the West, the roads under discussion seem to leave out all considerations of trade, and economic factors generally, and to consider railways only from their political, and military value. Whilst this policy may be a progressive one on the part of Great Britain, the writer fails to see why China should be called upon to foot the bill for roads that cannot advance her commercial interests and would appeal to all friends of China, to get the best possible lines to develop trade—and not militarism.

All roads, whether projected or existing, may be divided into two classes, the first to include all roads that cannot by reason of the sea board connections and geographical positions, assigned to them, be other than political or military roads, the second to include all roads that by reason of their route, may be looked to develop the three Western provinces of China.

In the first class must be put the Tonkin railway, the proposed Bhamo, Tengyueh, Tali, Yunnanfu railway, the Suifu railway, the Lashio, Kunlong, Nam Ting, Yunchou, Talifu railway.

In the second class the Poseh, Yunnanfu railway, the Singyifu and Nanningfu railway, and the Bhamo, Tengyueh railway.

The Tonkin railway is included in the first category inasmuch as, whilst its position geographically should make it the most favourably situated to serve the central part of Western China, the policy of the French government in putting prohibitive transits on merchandise, en route for and from China, prevents the road developing Yunnan or Kweichow, as it otherwise would, and until these rates are removed, the Tonkin road must be looked upon as more of a military line than anything else.

In regard to the Bhamo, Tengyueh, Tali, Yunnanfu line, whilst Bhamo is not on a railway, yet it is the head of navigation on the Irrawaddy, and has a fine service both freight and mail, all the year round, and a line from Bhamo to Tengyueh, up the Taiping River,—a distance of 123 miles in an easy country to within 15 miles of Tengyueh, where hills are encountered,—would undoubtedly pay, not only for the through traffic, but for the local traffic, especially in rice and foodstuffs, but if the line is carried through past Tengyueh East towards Talifu, the writer cannot believe that such a line can pay.

Bhamo is at an altitude of about 354 feet above sea level. Tengyueh, 123 miles N. N. E. is at an altitude of about 5,350 feet; continuing eastwards, the lay of the land, is mountain ranges running north and south, dividing first after Tengyueh, the Shweli watershed, from the Salween, then the Red River from the Mekong, and taking any route from Tengyueh, it is necessary to climb and fall an aggregate of over 12,900 feet, not counting rises of under 100 feet, in a distance of 115 miles tangentially, or about 188 on any line that can possibly be taken. Whilst in engineering, nothing is impossible, yet economically as the line will run through a most sparsely inhabited country, it cannot be seen that a line that will in the first place not admit of merchandise being sent into China without transshipment at Bhamo, and will then have a haul of over 312 miles to Tali, another haul of 228 miles to Yunnanfu, or including the distance from Bhamo to the sea by boat, a total haul from sea board to railhead at Yunnanfu of 1,380 miles, can possibly be considered in the light of an economic factor built for the well-being of commerce.

Again, the cost of the first section, Bhamo to Tengyueh, will be light, not exceeding £8,500 for a meter gauge line, but this will be offset by the cost of the second section that will cost at least £20,000 per mile, and it is on this section, that the least local traffic may be expected, whilst the third section will average about £10,500 per mile so that at the best—using Indian methods of construction—the whole line cannot be built for less than £8,000,000 including rolling stock, which sum might be spent in many ways, far more calculated to help China develop.

The Lashio, Kunlong, Nam Ting, Yunchou, Yunnanfu line, whilst avoiding the heavy grade crossings of the more northern line, is open to the objection of length, as Lashio is 570 miles from Rangoon, and the line between Mandalay and Mawmye ascends a face of the hills forming the Eastern wall of the Irrawaddy, by means of a switchback—and the whole road at this section which rises 3,600 feet in less than 30 miles at 4 per cent. grades, is not now, and is never likely to be capable of handling heavy freight; moreover, as no line in Burma connects with the Indian systems, and as the Burma railways are meter gauge, as against the standard and broad gauge of the main Indian systems, it is difficult to understand how such a line could be made to connect unless the gauge was changed throughout.

As projected, the length of the line from Rangoon to Siakwan or Tali, via Yunchou, is 989 miles, and from here to Yunnanfu, about 225 miles—hence the haul from the sea board, in this case, can be reckoned at 1,220 miles.

As regards the cost of this line for meter gauge, the writer—who has been over the whole route—cannot believe that it will average less than £17,000 per mile for the 212 miles between Kunlong and Yunchou, and from £10,500 to £15,000 per mile for the remaining sections.

Both these routes lie open to the objection, that the termini on the sea board are in foreign territory, in both cases, and merchandize would always be subjected to outside interference, in time of war, whilst in times of peace, taxes to any amount can be levied on goods in transit.

*The Suifu-Yunnanfu line cannot be said to be a commercial line, as the terminus on the Yangtze is not the head of navigation, and goods cannot be brought up to Suifu without very considerable cost and risk. In length, as projected, this line is 412 miles; the first section following down the Nui Lan river from its source near Yunnanfu to a point about 22 miles south of Chaotungfu, is easy country, but very difficult work exists between this point and Chaotungfu, and again from Chaotungfu to Takwan Lo with heavy grades, long tunnels and side hill cuts whilst just west of Takwan the line descends by means of a switchback to the Heng Chiang, which at this point falls 3,000 feet in less than 20 miles. The total cost of this line has been estimated at £7,000,000 for American practice line, but if a Continental or British Syndicate was building, the cost would probably be nearer ten million sterling. It is stated locally that this line is desired to develop local trade between Yunnan and Szechuan, but unless Yunnan can be coupled up to a sea board line to the south or south-east, it is hard for anyone living in the country to understand how such a line can be of use in any direction, as Szechuan certainly could not afford to either receive or send merchandise via Yunnanfu to Haiphong, when she can ship it on Yangtze ports.

This, then, disposes of the first class of the proposed railways. The writer has the whole of the technical details relating to every survey made in the West but as these are not of general interest, he proposes only to touch on the economic side in this article, leaving the technics to a future paper.

To the East and South-east of Yunnan, there rises the West River. The height of navigation on this river lies as a point Poseh 284 miles from Yunnanfu as the crow flies,—or if river conservation works were carried out,—at Pai-Ai, 249 miles tangentially.

This point then, is the economic point of Yunnan, from a development standpoint, and to this point three surveys have been made. The first was made by Mr. K. S. Low, in 1910 from a point below Poseh to the town of Lopingchow, which lies 99½ miles from Yunnanfu. Mr. Low for reasons† carried his line from the West River up a tributary—the Lorli river—to

the north-west, from there ascended a range and dropped into the main stream of the Hung Shui Chiang, which he ascended to a point south and East of Lopingchow, where the steepness of the cliffs drove him up a tributary from the north, which he ascended, then descended, another small creek into the main river again at a point nearly due east of Lopingchow, when he left the main stream and turned west up the Twang Chang Ho, a river running past Loping 3 miles to the north of the town. Mr. Loh proceeded up this stream to a point east of the town of Yuehchow, and there the survey stopped.

According to Mr. Low's figures, which were given the Central Government, this line was 396 miles long, from Yunnanfu to Yuehchow (estimated) to Loping, and Poseh, and the cost—which the writer considers excessive—was placed at Tls. 51,000,000 for standard track, 80 lb. rails 2½% ruling grades, 12 degree curves, line and rolling stock complete.

The second survey, made by Mr. W. S. Dawley and the writer, was one run during 1912 and 1913. The route was Yunnanfu, Yanglin, Chuchingfu, Yuehchow, then down the Twang Chang Ho to Lopingchow, from thence due south to the crossing of the Pa-Da-Ho, then up a tributary—the Ching Shui Chiang—and across a ridge, a direction nearly on a "B" line with Poseh, to the head waters of the West River, from thence across the right wall of the main West River into the Hsi Yang Ho, joining the West River, ten miles above Pai-Ai, and continuing down the right bank to Poseh.

This line is 406 miles long, penetrates a richly settled country, passes en route, coal, copper, and spelter fields of known richness, and for a standard gauge track, 75 lb. steel, 12 degree curves, 2½% grades, can be built for £6,150,000, including river conservation works on the West River to give 24" water at all seasons.

The third survey of this line was made last year, and the route chosen was the most direct possible, viz., Yunnanfu, I-Yeang Hsein, Da Shao, Dia Dee, Shih Tung Hsein, proceeding to the Pa-Da-Ho south of Loping direct, shortening the second survey by 36 miles, and bringing the total estimated cost down to £5,640,000.

During the whole length of both surveys as above (2 and 3) the projected lines run through the richest and most thickly populated portions of Yunnan and Kwangsi, in easy country, presenting no engineering difficulties of any kind, and either route, would bring Yunnan in direct communication with Canton and the Southern sea board.

In regard to the Shingyifu, Nanningfu line, this, so far as the writer is aware, has never been surveyed, but the country from Shingyi, directly south-east, is easy, being for the most part rolling hills, of under 5,000 feet altitude, whilst the bulk of the country lies at 3,000 feet and under. (It should be noted, that even the best maps put the positions of Poseh, Shingyifu the Hung Shui, and all this section, incorrectly, as Shingyi lies further south, and Poseh further east than is shown.)

If railways are to be built in the West, to develop China, then the soundest lines are certainly those which will terminate at Canton. Ocean freights from Europe and America are better to Hongkong, than to Hankow as a rule, and until the Yangtze becomes navigable up to Suifu, for cargo craft, and until the dangers to navigation can be removed in the river, below this point no line that will not give Yunnan, at least as good a service as the Poseh one should be discussed. Connection could be made with the Yangtze valley line by a branch from Lopingchow to Shingyifu, a distance on a line of 103 miles, so that for 550 miles of railway would, with the connecting lines, join up Yunnan to Hankow, and to the West River navigation ports, or if the Poseh line be continued to Nanningfu, a total length of under 1,000 miles of line, would put Yunnan, Kweichow and Kwangsi within three days of Hongkong and also in touch with the Yangtze.

To build lines to a sea board on the Bay of Bengal—600 miles as the crow flies, or to Bhamo, 360 miles in a line, through the worst country in Western China, may be good for foreign countries; it is certainly not developing a poor country to the best advantage, although it is admitted that the Bhamo, Tengyueh line, would be good, if it stopped at Tengyueh, as up to this

* When Mr. Moore-Bennett wrote this article the Banque Industrielle Agreement for a line connecting Yunnanfu with Chungking had not been made.—Ed.

† Mr. K. S. Low states that his route was selected after instrumental survey, and follows almost direct valleys; that he desired to escape taking a route which would compel a junction with the French railway south of Yunnanfu, that the lay of the mountains were such that it was more advisable to keep well to the east of Yunnanfu; that rich valleys are tapped by his route. Ed.

point no engineering difficulties are encountered, whilst it would serve the whole of the west of Yunnan and, unless the Tonkin railway removed its rates, a considerable portion of Central Yunnan, but in no sense can any line coming from the west develop, Kweichow, Kwangsi, or Szechuan, to the best advantage.

The Suifu line, might justify its expense by reason of its opening up of the Tung Chuan Copper, spelter and coal fields, and by reason of it allowing China to concentrate troops at any point along her Western frontier, but it will be to the West River lines, that the West must look for the salvation that cheap transport to the sea gives to countries in a backward state of development.

A close study of the situation, and of any ordinary map of Yunnan will, the writer feels, surely convince any fair minded person that if China is to be saddled with a debt of seven to ten million pounds for railway construction, then the railway to be built should be one that will open up the most country at the least expense—it being borne in mind always, that, first, any line that is not entirely in Chinese jurisdiction, from railhead to sea board cannot be considered satisfactory, and, second, that ocean freights anywhere are cheaper than rail freights ever can be.

The writer has travelled, continuously in Yunnan for six years, and knowing the West, he cannot conceive a more unfair road, than the suggested Tengyueh, Tali and Yunnan line in view of the known easy route to the West River watershed.

The road can never compete with the Tonkin line, if the latter removes its prohibitive dues, which it is likely to do the minute competition takes place, and as a consequence, China will be saddled with 350 miles of expensive track—built at enormous cost, of a different gauge to her main trunk lines—a white elephant of no value to any save British Commanders-in-Chief in India.

In conclusion, any technical details of the lines under review will be gladly furnished to interested parties—on application to the Editor of the FAR EASTERN REVIEW.

INTERNATIONAL INTRIGUES IN CHINESE RAILWAYS

In view of the disclosures made in the article in the January issue of the FAR EASTERN REVIEW in regard to international intrigues in connection with the railways of China, it is significant that the Belgian Legation at Peking has been constrained to notify the Chinese Government that the Lung-Tsing-U-Hai Railway Loan is Franco-Belgian, not purely Belgian as the Chinese were originally given to understand. This notification was also prompted by the fact that the French capitalists refused to recognise the appointment of any but a French chief engineer, which the Belgians were willing to accede to, but which the Chinese opposed on the grounds that the French had no say in the line since the line was purely Belgian. An allusion to this difficulty was made in the article in the January issue of the FAR EASTERN REVIEW.

It is also interesting to note that the British have protested against the Lung-Tsing-U-Hai line terminating at a port on the Yangtsze instead of at Haichow as originally proposed. It is reported that the Chinese have notified the Belgians that the terminus of the line must be elsewhere.

PROPOSED NEW RAILWAYS IN CHINA

Active negotiations have been proceeding of late between the British and Chinese Corporation, Limited, and the Ministry of Communications, for the construction of a line from Nanking to Nanchang, the capital of Kiangsi province, and to Changsha, the capital of Hunan province, where a junction will be made with the Canton-Hankow railway. The line will, of course, be an extension of the Shanghai-Nanking railway, and will put the capitals of three provinces in touch. As a matter of fact if the Pauling railway is built to Kweichow and connection is made with Yunnanfu, there will be railway connection south of the

Yangtsze direct from Shanghai to the capitals of Kiangsu, Hunan, Kweichow, and Yunnan provinces, with possibly a branch line to the Yangtsze opposite the capital of Anhui province. The British and Chinese Corporation are also negotiating for railways north of the Great Wall, from Hulutao, on the Peking-Mukden line, to Chaoyangfu (a map of which appeared in a recent number of the FAR EASTERN REVIEW) on to Chihfeng, to Changtehfu (Jehol) and to Tungchow, near Peking, with possibly an extension to Dolonor. The Chinese are anxious to have these lines built, but the arrangement between Britain and Russia under the Scott-Muravieff agreement will probably prevent British capital operating, and the Chinese may possibly have to build this system with their own money.

In Fukien province, which the Japanese have endeavored to ear mark as their "sphere" in southern China, an effort is now being made by Japanese capital to secure a long-cherished railway from the port of Foochow north-westwards to Nanchang the capital of Kiangsi province. This line would connect with the Japanese line which is now in course of construction from Kiukiang on the Yangtsze River, to Nanchang, thus giving through connection between the Yangtsze and Foochow on the coast. The railway is an important one for Fukien province and must be built some day or other, even if the Chinese repulse the Japanese overtures now.

JAPAN AND THE HANYEHPING LOAN

A storm of protest has arisen in certain circles in China in connection with a loan transaction made by the Hanyehping Company—the organization which controls the Hanyang ironworks, the Tayeh iron mines and the Pingsiang collieries,—with the Yokohama Specie Bank, of Japan. The loan is \$15,000,000, of which \$6,000,000 was to be devoted to paying off obligations of a current nature, and \$9,000,000 to the improvement of the equipment of the Tayeh iron mines. The loan was to bear 6% interest, and the principal was to be repaid in the shape of iron ore to the quantity of 13,000 tons per annum, to be delivered at a price fixed for ore of varying grades. The agreement provides that a Japanese engineer and a Japanese accountant shall be engaged by the Company for the purpose of supervising the expenditure of the money.

When the fact became known to certain sections that a loan had been contracted by this Company with the Japanese an immediate outcry was made that the Company was "selling sovereign rights," and an attack was levelled at the Minister of Industry and Agriculture, Mr. Chang Chien, who was accused of consenting to the deal, if not of participating in the actual negotiations. Public meetings were held, the native newspapers opened a campaign, and telegrams and letters were sent to Peking demanding a cancellation of the agreement on the grounds that the Hanyang ironworks and the subsidiary industries at Tayeh and Pingsiang—constituting China's most vital existing industry—were being handed over lock, stock and barrel to Japanese control.

It is stated that the protests were supported both by President Yuan Shih-kai and Vice-President Li Yuan-hung. The Minister for Industry declared that he was not involved in the transaction in any way, and in due course despatched a telegram to the head office of the Company instructing that the draft agreement for the loan must be submitted to the Ministry for approval before it is signed and describing it illegal if it has been signed without first being submitted. About the same time Mr. Sheng Hsuan-huai, representing the Committee of Directors, (and who as Minister of Communications in 1911 devised a scheme for nationalisation of railways which precipitated the revolution*), applied to the Ministry for approval of the loan on the grounds that the Company was a private one, recognised by the Manchu Government as such, and that therefore it was privileged to borrow money without reference to the Government. He added that in May, 1911, owing to shortage of funds, an arrangement was come to with the Japanese Iron Manufactory and the Yokohama Specie Bank for a loan of \$12,000,000, of which

*See Revolutionary Number of the FAR EASTERN REVIEW April, 1912.

\$3,000,000 was paid up, and the balance withheld owing to the revolution. The loan had since been resumed, and the \$9,000,000 was to be paid in three years for the expansion of the Tayeh works and another amount of \$6,000,000 was to be secured for the purpose of repaying all short term loans for which the Company had to pay heavy interest. The loan agreement was signed according to former procedure on December 12 last year, and in the annex to the agreement it was stipulated that the Company might repay the loan with Government funds so long as those funds were not borrowed from any other foreign concern. The Government may, therefore, if it considers the loan disadvantageous, give assistance to the Company to repay it, and the Company will be glad to negotiate with the Japanese Bank to repay the money.

The Minister of Industry replied in blunt terms to this document, pointing out that on June 6, 1912, the Government announced throughout the provinces that no loan would be valid if secured upon mining properties, without the sanction of the Government. As the agreement between the Hanyehping Company and the Japanese Bank contravened these orders the loan was invalid, and the Minister declared the agreement null and void, at the same time demanding that the Company should wait for instructions which would be given after the Ministry consulted with the Board of Finance.

It would seem that the Government has effectively answered the protests of the people, and now it will have not only to see to the saving of the Company from bankruptcy but might also be called to account by the Japanese. The contention of Japan is that its financiers have been involved in the Hanyehping concern for more than twelve years, having loaned up to \$20,000,000, and that those interests have to be protected. Insofar as the operations of the Japanese might conflict with other nationals in the Yangtze Valley the Japanese hold that as they have vested interests in the region, and as the supply of iron ore and coke is essential to the sustenance of Japan as an industrial and naval nation, they must decline to be influenced by considerations which are solely political on the part of other nations. The Japanese have been buyers of big iron from Hanyang for many years, while at the same time they have been constant customers for iron ore from Tayeh and coke from Pingsiang. This trade is vital to them as a nation, and it is one which they will not permit to be disturbed without a struggle.

Mr. H. C. Carter, the Engineer-in-chief of the Shasi-Shing-yi line recently allotted to Messrs. Pauling and Company to build by contract, has arrived with Messrs. C. F. Tristram, B. F. Nell, and E. A. Scott to make a reconnaissance of the route, and subsequent survey. The reconnaissance will take several months to complete.

COST OF RAILWAY BUILDING IN SOUTH CHINA

Under date of January 22, Mr. Frank Grove, M. Inst. C.E., and Engineer-in-chief of the Chinese Section of the Canton-Kowloon Railway, writes to us in connection with the costs of labor and construction work in the south of China. We are very pleased to publish Mr. Grove's letter, as a valuable contribution to the subject. He writes as follows:

To the Editor of the FAR EASTERN REVIEW.

Sir,—With reference to Mr. Bronson Rea's interesting article entitled "An Appreciation of China's Railway Engineers" in your November issue, allow me to point out that the rates quoted therein are in one particular misleading, though doubtless quite unintentionally so.

I refer to the paragraph as follows: "The average cost of earthwork on the Shanghai-Nanking Railway was 15 cents silver per cubic yard, on the Canton-Kowloon line 33 cents per yard, whereas the average cost per cubic yard on the Changshui extension has been about 6 cents per cubic yard."

I have stated in a paper on the construction of the Canton-Kowloon Railway, Chinese Section, that the average cost of finished earthwork of all classes (which, of course, included rock), also added contingencies, and protection works, did not exceed 32 cents per cubic yard; in fact the whole cost of earthwork, and rockwork, under its head of accounts,

works supervision, explosives, stone pitching, retaining walls, tools (but not "plant" unless broken up and so "charged off" to earthwork) was divided by the total quantity, an average rate thus resulting.

The context of my paper showed that protection works were remarkably heavy, in one cutting alone \$90,000 was spent on piling, retaining walls, &c., in order to deal effectively with a peat bottom and slipping sides, also 5 miles or so of high embankment were faced with stone, besides usual stone protection and turbing throughout. The percentage of rock, while, but a small portion of the whole, was by no means inconsiderable—actually about an eighth, a usual proportion in such country.

The rate was given, therefore, to engineers for estimating purposes where conditions are similar to those holding here which were fully described, namely, very high banks in flooded country, deep cuttings with treacherous slopes, &c.

It has not come to my knowledge that local Chinese engineers are able to obtain lower rates than foreign engineers. The old story of interpreters, employed by the latter, making huge "squeezes," has no bearing in recent years whatever it had in the past.

Interpreters are not needed. Contractors mostly speak English; local rates are well established, especially near large centres. Public and sealed tenders are taken too, and in the case of this railway, out of 30 such, only one contractor quoted an initial rate for earthwork of 48 cents per 100 c.ft. or, say, 12 cents per cubic yard, which rate has never been reduced. There is evidence to show, too, that contractors made little money—no suicides were reported as seems to have been the case in the North, but many tears were shed and the foreign engineers also proved themselves hard hearted! Professional earthwork labour is very poor near Canton, and Kowloon, owing to every one being very well off, and probably labour rates generally are higher than anywhere else in China. Importation of coolie labour is not permitted.

An interesting case occurred in 1909. Some 1,000 coolies brought from Hunan by an enterprising contractor were stated to have been branded and led away in chains, a most unlikely proceeding having regard to the bellicose character of the Hunanese. Repatriation promptly followed by order of the Viceroy, and, to add insult to injury, a claim was raised for costs! I merely mention this to show the difficulties of introducing new factors in competition such as would lead to a reduction of rates and a consequent economy.

I am at one with Mr. Bronson Rea in his appreciation of work done by Chinese engineers and in his well wishing towards the individuals—among all engineers there should be, and generally is, comradeship, mutual trust and appreciation, though unfortunately this may not be so evident in China as elsewhere. And for myself I cannot help feeling that such mutual understanding can only be obtained or improved by a just and frank recognition of the fact that all experienced engineers, of whatever nationality, who are fit to be trusted in charge of important works, are one and all equally able in carrying out the obligation of their duties.

To turn again to the matter of comparisons, it is somewhat strange that rates paid on a railway built in the extreme north of China, where labour is proverbially cheap, should be set against rates paid in the extreme south where conditions are so entirely different.

The statement made that "labour costs are generally about 25 per cent. higher in the South than in the North," is my own. This I must qualify in the case of *earthwork* and *unskilled* labour. It can be confirmed by anyone who cares to enquire that it is much nearer 100 per cent.—that is, the Northern labourer would be paid 25 cents against the Southerners 50 cents, though on piecework he would probably do more work and thus earn proportionately more. Thus the difference in initial rates can be amply accounted for.

Engineers who are able to carry out works with extreme economy owing to local conditions are, I grant, fortunate, for comparisons though sometimes "odious" cannot well be avoided. What I have written, however, will, I hope, enable a fairer conclusion and remove some misconceptions.—Yours, etc.

FRANK GROVE, M. INST. C. E.

PROSPECTS OF WEIHAIWEI

A correspondent writes from Weihaiwei:—The building boom continued right up to the middle of December, when heavy frosts stopped the work. The foundations of new buildings for Fock Tai & Co. have been laid, and the buildings will be erected as soon as possible in the coming spring. We shall shortly have business houses scattered all over the mat'on, extending from near the hospital on the east side right down to the city wall. Land for building purposes has gone up in some parts to four and five times its former value.

Industries of various kinds are being begun all over the Promontory. On the mainland, ladies' hair nets are being made and shipped to Germany, the hair being first of all sent from China to Germany to be prepared and re-shipped here to be made into nets. Women and girls learn the process of making these nets in a few hours, so it is giving employment to many all over Eastern Shantung. At Yungchenghsien a weaving factory has been started, employing about fifty hands, and is proving quite a success.

In Shihtao an enterprising Huanghsien merchant, who has a weaving factory and dabbles in photography, has started a factory for making a kind of isinglas or Iceland moss, from a sea grass called Lungtsuts'ai. It seems to have a big future before it.

THE TSING HUA COLLEGE, PEKING

With special reference to the Bureau of Educational Mission to the United States of America.

[BY RICHARD ARTHUR BOLT, A.B., M.D., PHYSICIAN OF TSING HUA COLLEGE.]

In the summer of 1881 the first Chinese Educational Mission to the United States of America, under Yung Wing, came to its untimely end. The fate of the Mission was sealed in 1876, when Yung Wing accepted the post of Associate Minister to the U. S. A., leaving his pet scheme open to the machinations of the Commissioner of the Educational Mission, Wu Tzu-ting. Mr. Tong Kaisan, one of the original Yung Wing students, has aptly summarized the different accusations which were brought against the students as follows: "The boys had, by imbibing the spirit of American institutions, lost all sense of duty and obligation towards their Sovereign and their country; they had adopted American customs, sentiments, habits of life and thought; they entertained, by reason of their republican education and training, the most radical and subversive opinions and the most partisan feelings; consequently, to patronize such men was to sow the seed of future discord and rebellion; they had all rejected the doctrines of Confucius, and some of them had embraced the tenets of an alien faith; they were impatient of authority and cherished contemptuous opinions of their government; and, lastly many of them had shown a desire to become naturalized and to marry and settle down as citizens of the United States."

Whether true or not, it is easy to understand how Chinese official circles of thirty years ago would accept such accusations and make capital of them. The bringing of the boys back to China at this juncture, and the breakup of the Mission, produced the very results which the Commissioner and his colleagues had hoped to avoid. It is interesting, therefore, to study the causes which have led to the formation of another Educational Mission and the safeguards placed about it in order to escape the pitfalls of the former one.

The relations between the United States and China have, on the whole, been most friendly, despite the fact that a considerable labor element on the Pacific slope forced the Anti-alien Laws, and have succeeded in keeping them in force ever since.

As the people of the United States have come into more intimate contact with the better merchant class and students of China a high regard for their integrity and ability has developed. The United States Government itself has shown its friendly feelings by numerous exchanges of diplomatic courtesies, by its decided stand for the "Open Door" in the Far East, by its insistence upon the "Integrity of the Chinese Nation" and by its early recognition of the Chinese Republic. The most notable act of friendship of recent years was the remission of a portion of the Boxer Indemnity Fund. According to the Protocol of September 9, 1901, the United States was to receive as indemnity from China the sum of \$24,400,000 gold. After making arrangements for the payment of all just claims, and adjusting some differences which were not foreseen at the time the original indemnity was decided, Congress of the United States passed a bill authorizing the President to arrange to remit to China the remainder of the indemnity. The original indemnity bond was modified from \$24,400,000 gold to 13,655,492.29 gold with interest

at 4% per annum. Of this latter amount \$2,000,000 gold were held pending hearings on private claims within one year. In round numbers, then, this gave the Chinese Government \$11,000,000 gold, to be remitted from the total indemnity—collected quarterly—during thirty years.

An envoy was dispatched from China to the United States to thank the President for this "act of friendship." In a note from Prince Ch'ing to Minister Rockhill, dated July 14, 1908, the purpose for which the money was to be expended is stated as follows:

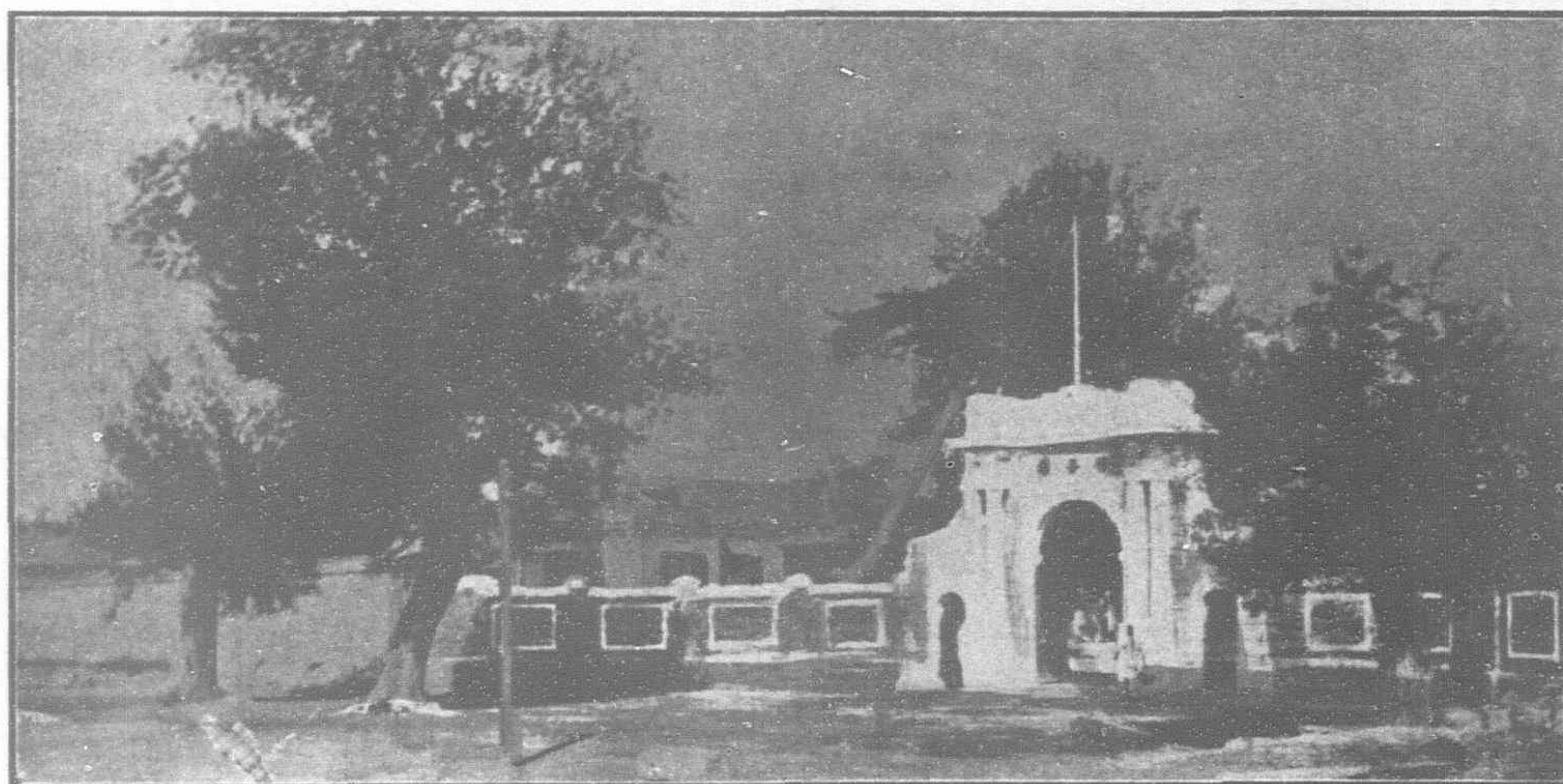
"The Imperial Government wishing to give expression to the high value it places on the friendship of the United States finds in its present action a favorable opportunity for doing so. Mindful of the desire recently expressed by the President of the United States to promote the coming of Chinese students to the United States to take courses in the schools and higher educational institutions of the country, and convinced by the happy results of past experience of the great value to China of education in American schools, the Imperial Government has the honor to

state that it is its intention to send henceforth yearly to the United States a considerable number of students there to receive their education. The Board of Foreign Affairs will confer with the American Minister at Peking concerning the elaboration of plans for the carrying out of the intention of the Imperial Government."

The plans finally evolved resulted in the formation of the "Bureau of Educational Mission to the United States of America." This Bureau was under the joint control of the

old Wai Wu Pu (Board of Foreign Affairs) and the Hsue Pu (Board of Education.) All affairs pertaining to the selection and sending of Chinese Government students to the United States, and their entire support, was to be under the jurisdiction of this Bureau. The Wai Wu Pu thereupon appointed H. E. Chow Tze-chi as Director, and H. E. Tong Kaisan Co-Director, to confer with Mr. Fan Yuen-lien as Co-Director from the Hsue Pu. Dr. C. D. Tenney, then Chinese Secretary of the American Legation at Peking, was delegated by the American Minister to represent him in an advisory capacity to the Bureau. Comprehensive "Rules for the Selection and Sending of Students to America" were drawn up by the Bureau and sanctioned by an Imperial Decree of July 10, 1909.

It was originally deemed advisable to select students on competitive examination from any school in the different Provinces. In this case the Bureau simply acted as an examining body with considerable discretionary powers. According to this plan the first competitive examination was held in Peking at the Yamen of the Board of Education in September, 1909. Over 600 students came up to the Capital from practically every Province to try for the coveted honor of being chosen to go to the United States. After a preliminary test in Chinese and English Literature and Composition, the number of students considered eligible to proceed with the final examination was reduced to 80. These were further examined in Algebra, Plain and Solid



Main Entrance to Tsing Hua College.

Photo by R. A. Bolt.

Geometry, Trigonometry, German and French, Latin, Physics, American and English History, History of Greece and Rome, and Chemistry. A final selection of 47 students was made. It was discovered from this examination that the greatest difficulty was shown in the proper use of the English language. After a medical examination by the Physician to the American Legation Guard, and suitably equipping themselves at Shanghai, they sailed for America on October 12, 1909, under the care of H. E. Tong Kaison. The students were distributed among a number of the leading Academies and Colleges of the United States.

A second examination was held in the Law College, Peking, from July 21st to July 29th 1910. This time 400 students from all over the Empire participated, the Provinces of Kiangsi and Kwangtung being most largely represented. The list of examination questions was practically the same as at the first examination. After the preliminary test 172 boys were allowed to proceed with the finals. Of this number 70 were chosen to go to America. It was stated that a larger number of these students were able to enter American colleges without additional preparatory work, but it was forcibly brought home to the examiners that more thorough preparatory work would have to be done in China before the students could do full justice to their advanced studies in the United States. The original plan contemplated that 100 students would be sent each year for the first four years and 50 per year for a period of 29 years. It was found impossible to select so large a number at first well enough prepared in English to enter the higher educational institutions. Then came the Revolution which crippled the finances so much that the original plan had to be held in abeyance.

In order that the students should be better equipped to enter American universities without further loss of time in preparatory schools in the United States it was finally decided to establish under the Bureau a school in which all future Government students, to be sent to the States on the Indemnity Fund, should be trained. Strong arguments were advanced for the establishment of such a school in the vicinity of Peking. It was urged that while the magnificent sum of \$150,000 gold was available annually it would be a good investment to build a model institution capable of developing into the best in China. For such an institution the Chinese Government, at the expiration of the "indemnity fund," would certainly find other means of support. In the outline for this new school it was stated that "American teachers, both for the advanced and the elementary classes shall be engaged, and the methods shall be those of American schools, so that the students by their familiarity with American methods may suffer no inconvenience in entering American schools. This school shall be solely for the purpose of giving temporary instruction to the students chosen from the different provinces in order to test their character and ability."

The manner of selecting the American teachers for this school is worthy of note, as showing the confidence the Directors

placed in a man representing avowed Christian ideals and principles. After most careful consideration the Directors, acting upon the suggestion of Mr. Tong Kaison, decided to delegate to Mr. John R. Mott the securing of suitable teachers for the new "Indemnity School." Knowing that Mr. Mott was in close touch with organisations in America which could indicate well qualified teachers, and having the necessary office machinery at his disposal, proved the farsightedness of the Directors in placing in his hands the selection of the teachers. After considerable deliberation an American faculty, consisting of

nine ladies and eight men, was selected. This number included a Physician and a Physical Director for the College. These teachers, with the exception of the Physical Director, sailed from San Francisco on the s.s. "Tenyo Maru," January 18, 1911. They were officially received and royally entertained at Honolulu, throughout Japan and in Shanghai, arriving at Peking February 21st. Here they were detained some six weeks awaiting the completion of the new buildings at Tsing Hua Yuan. Since then the Physical Director has arrived; five men and one lady from the U. S. A. have been added to the teaching staff; while three ladies and two men have left the school.

The preparatory school, now known as Tsing Hua College, is situated about

four miles outside the northwest city gate (Hsichihmen) of Peking on the line of the Peking-Kalgan Railroad. It is beautifully environed amidst rural surroundings in sight of the new Summer Palace, and almost adjacent to the magnificent ruins of the Old Summer Palace (Yuen Ming Yuen). It has been stated that this site was originally occupied as the country residence of the notorious Prince Tuan of "Boxer" fame, and that after his downfall the old Empress-Dowager confiscated his property and turned it over to the Wai Wu Pu, for the use to which it is now being put. Others question this and affirm that the Park was originally the property of Prince Tun, the fifth son of Tao Kuang. In fact the local name for the place has long been Wu Ye Yuan, which means the "Park of the Fifth Prince."

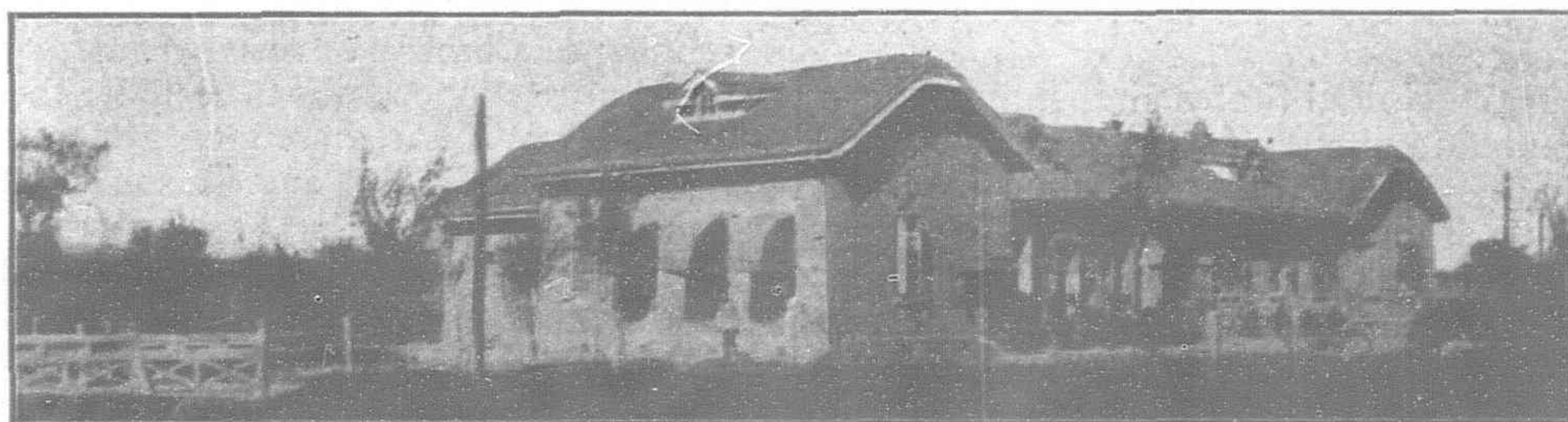
When the Park was handed over to the Bureau of Educational Mission to the United States by Imperial Edict issued at the instance of the Prince Regent in 1911 the Tsing Hua College was at once laid under the direction of the then Vice-Minister of Foreign Affairs, Mr. Chow Tze-chi, who was

once Charge d'Affaires in Washington. The late Mr. Tong Kaison, who was eventually President of the College, and Mr. Y. L. Fang, afterwards Minister of Education, co-operated with Mr. Chow Tze-chi in this work, and as a result of their efforts a number of buildings were erected in 1910 and 1911 sufficient to accommodate 600 students, the contract being carried out by Mr. Emil S. Fischer, formerly of New York and now head of Fischer and Co. of Tientsin and Peking. The cost of the work was over half a million Taels, or about \$350,000 gold dollars.



Photo by C. B. Malone.

Regular Daily Exercise at Tsing Hua College. Main High School Building in Background, Assembly Hall to right in picture.



Hospital and Dispensary Building, Tsing Hua College

A well built stone wall completely surrounds the 60 odd acres which make up the College Compound, which will be improved as soon as necessary funds are available. The College has recently acquired 60 more acres to the west. The Compound is attractively landscaped with artificial tree-topped hills, lotus ponds, and a small stream which runs directly through it. A considerable number of trees have been planted, a greensward laid out, and many flowers placed on the hillsides. The buildings of foreign, semi-foreign and Chinese architecture are conveniently grouped in the Campus. The offices of the Bureau of Educational Mission to U. S. A. were originally housed in the reconstructed Yamen, strictly Chinese in every detail, picturesquely surrounded by low hills and opening at the rear on to a marble porch which overlooks a lotus pond. There are substantial residences for the President of the College, the Dean, and a small Compound for the Chinese teachers, now numbering sixteen. The American teachers have had nine double bungalows allotted for their use, one of which has been comfortably fitted up as a Club House.

The High School department occupies a large two-wing double story grey brick building. This contains the educational office, offices for the President and Dean, an attractive Faculty room, the Chemical and Physical Laboratories, and various class rooms. Behind this building is an Assembly Hall which will accommodate about 400. Adjoining this at the rear are the High School study-halls, dormitories and dining room—all one story brick buildings connected by covered corridors. At the west end of the dining room a workshop for Manual Training has been fitted up, the boys of the third and fourth year Middle School and first year High being required to take this subject.

The Middle School is housed in a group of buildings separated from the High School by a small stream bridged in three places. It comprises classrooms, Proctors' and Secretaries' Offices, the beginning of a Museum collection, study-halls, dormitories, dining-room, kitchen, and out-buildings. These are all connected by covered passage-ways. Suitable bath and toilet arrangements have also been provided. Just west of the Middle School is a well laid out athletic field, tennis courts, basket ball grounds, football and baseball field, running track and space for field events, and an archery area. Athletics have now become compulsory for every student. He must take regular calisthenic exercises each morning as well as spend one hour daily in some out-of-door sport. Careful account is kept



Entrance to "Yamen" of Bureau of Educational Mission to U. S. A. and in background the Compound for the Chinese teachers, Tsing Hua College

Tsing Hua College was formally opened with Chinese ceremonies on April 1st, 1911. The High School Department was begun with 128 advanced students who had failed in their previous examinations to be selected to go to the U. S. A. 307 younger students were selected by the Provincial examiners, ostensibly upon competitive examination to enter the Middle School. Practically every Province in China, besides Manchuria and Mongolia, was represented in the School. After a complete physical examination the boys were allowed to take up residence. The teaching of the younger students was at first almost completely in the hands of Chinese teachers who then numbered about twenty. The American teachers were assigned, rather arbitrarily, to teach the older boys, from among whom it was understood that fifty would be selected that year to proceed to the United States.

The first Dean was a young man recently graduated from an American College of high standing. His record as a student had been exceptionally good, especially in mathematics, but he lacked executive ability and had no real experience in school organization. It was evident from the first that this inexperienced dean was not

going to coöperate with the American Faculty, nor plan the College work in such a manner as to inspire their confidence. In the outline for the first curriculum mathematics overbalanced everything else; in fact it crowded the study of English almost to second place. A foolish attempt was made to introduce a course in Esperanto; in fact the Dean at first succeeded in dubbing the new institution, "La Kolegio de Juna Hinujo." After trying in all tactful and courteous ways to obtain from the Dean some idea of what he was attempting to accomplish the American teachers felt it their duty to offer the following suggestions:—

"1st. That the curriculum be adapted to meet the requirements for

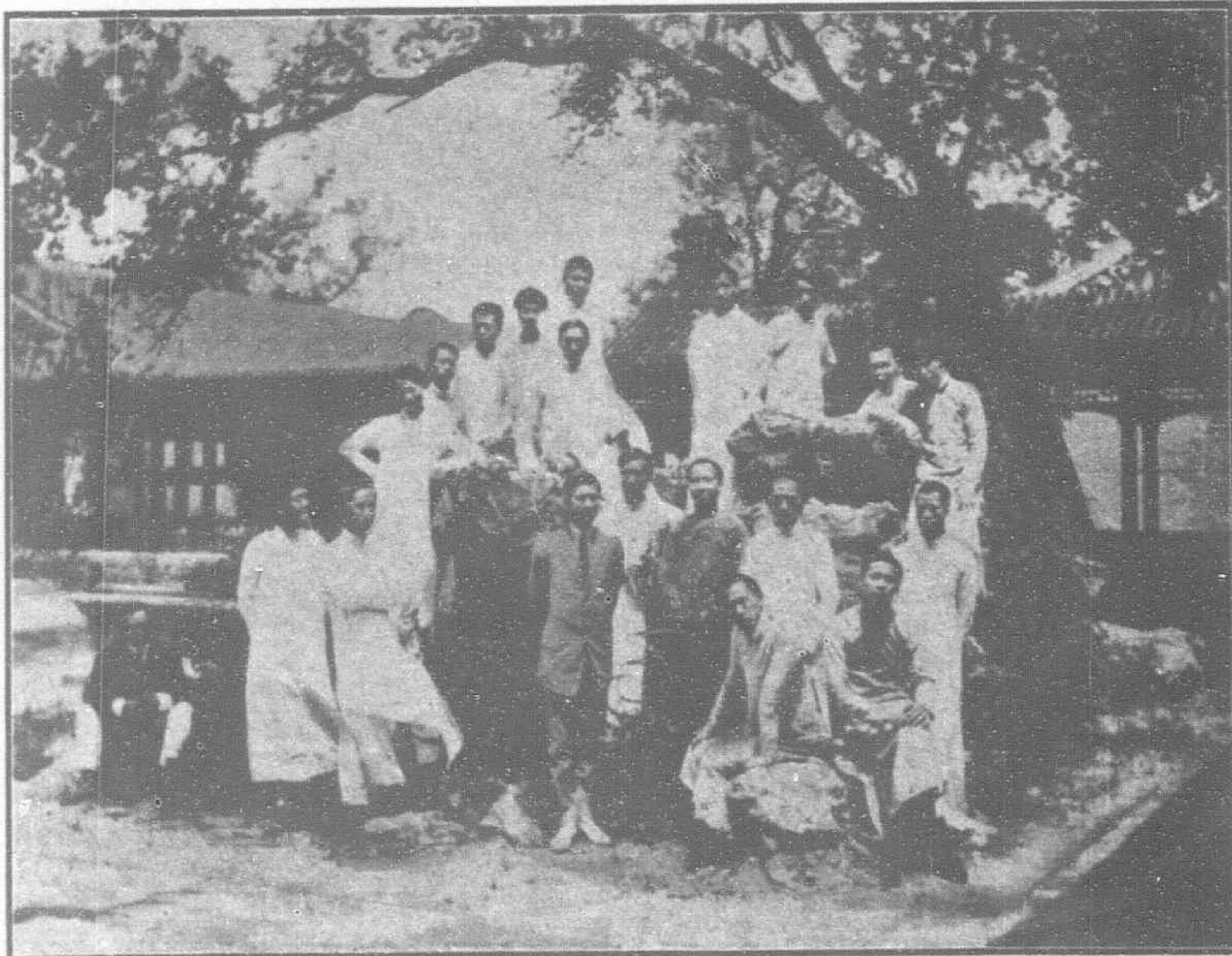
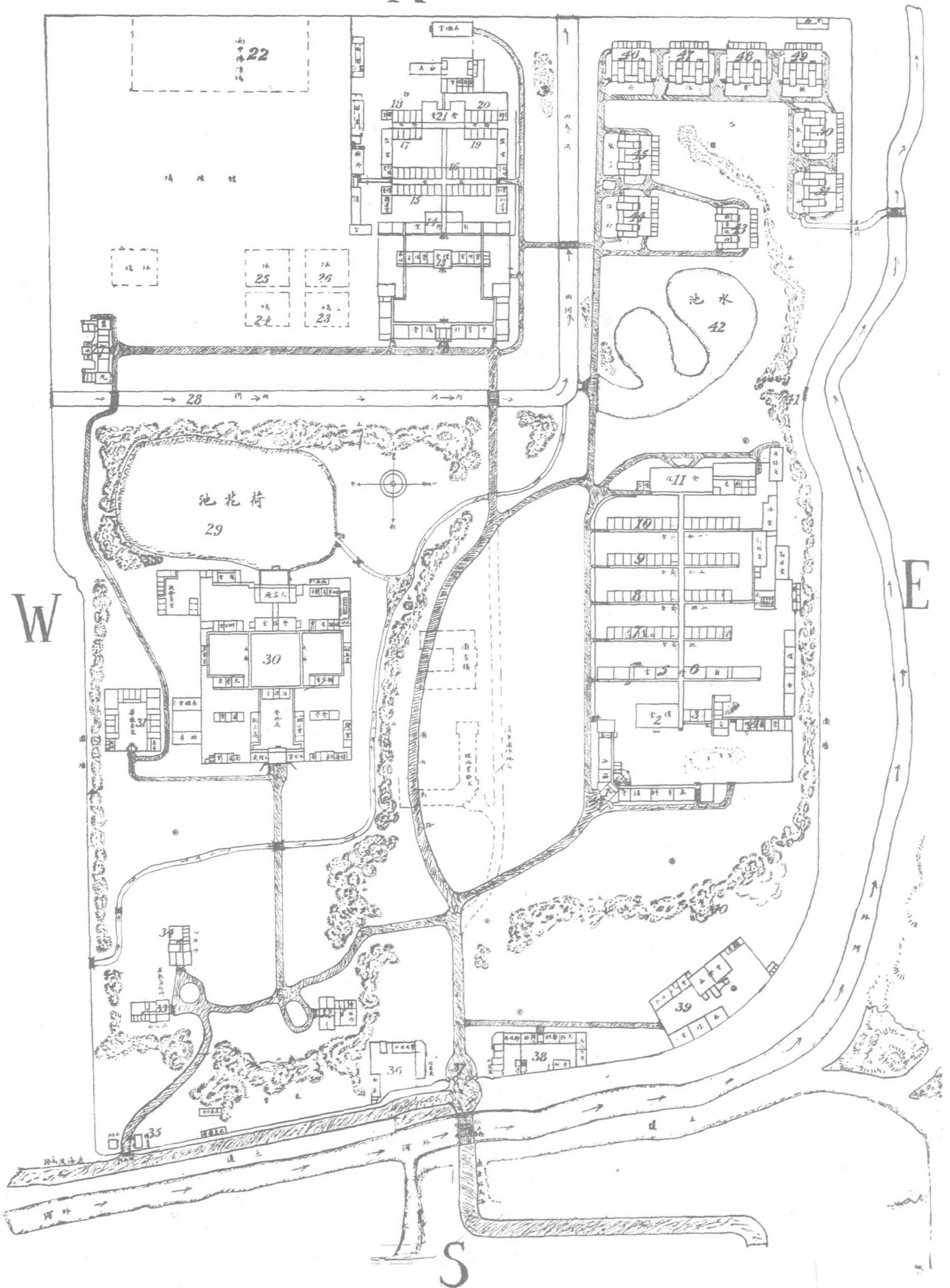


Photo by C. B. Malone

Group of High School Students at Tsing Hua College.

圖全 N 圖華清



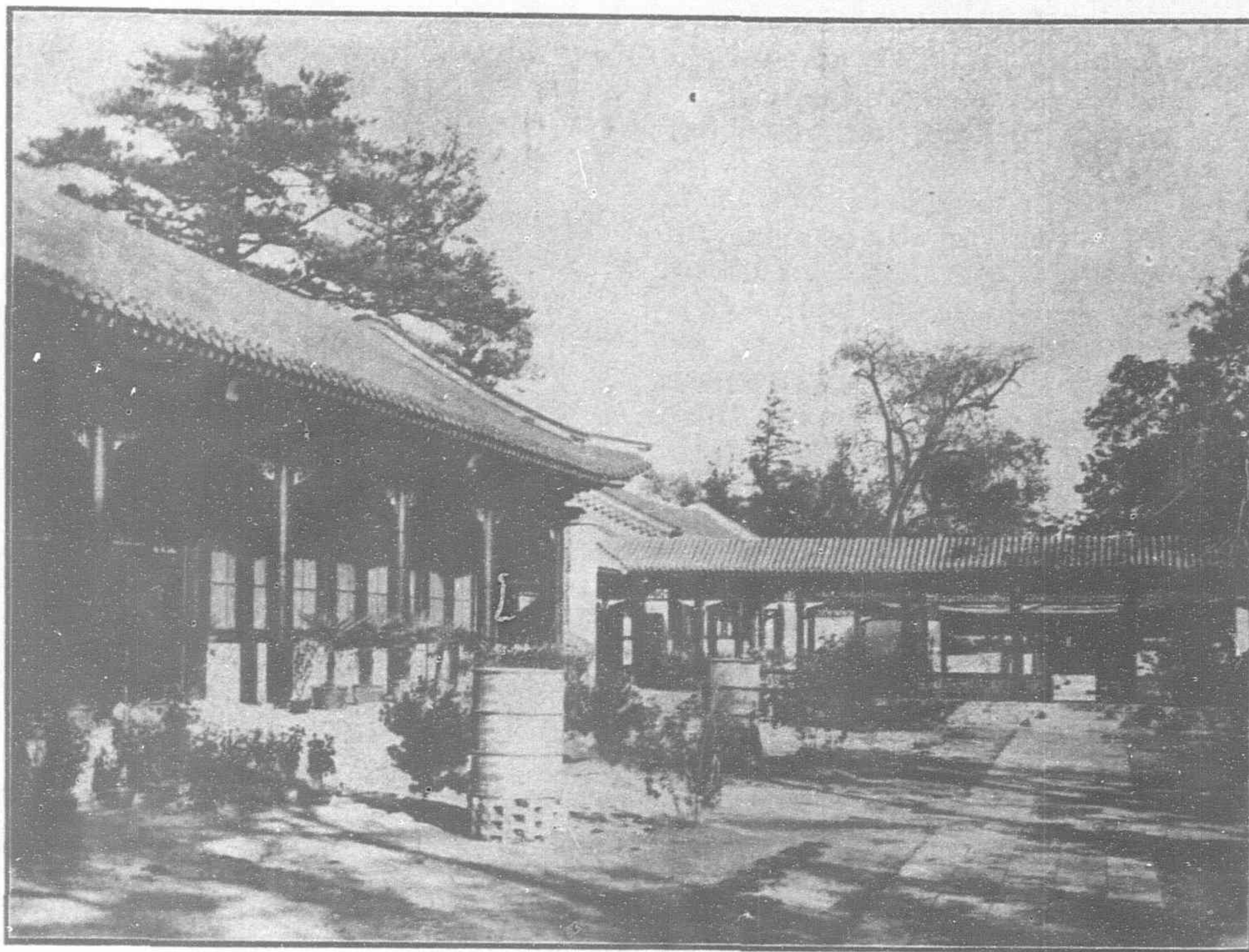
Plan of Tsing Hua College (See Key on page 369.)

entrance to American Colleges." (Up to this time there had been but little indication that this was being done).

"2nd. That the students be informed as soon as possible in regard to the above requirements." (Heretofore there had been great doubt and uncertainty).

"3rd. That immediate steps be taken to thoroughly prepare as many as possible of the advanced students for entrance to American Colleges next fall." (The policy of the Dean had seemed to thwart this very purpose).

"4th. That the teachers be kept in close touch with the educational plans and workings of the School." (Up to that time no faculty meetings had been held. The Regulations of the school were made out in Chinese largely by the Dean himself, and it was only after considerable pressure that translations were given to the American teachers. The Dean undertook to organize all the teaching work without consultation with the teachers, and assigned courses which were very illy balanced.)



The Central Court of "Yamen" of Bureau of Educational Mission to U. S. A., Tsing Hua College.

Following closely upon these recommendations the Dean "resigned of his own accord." The Directors then realized that the welfare of the new school depended upon the selection of a capable successor who could command the respect of the American faculty. Great tact and wisdom was shown in their next move. Mr. Chang Pe-ling of Tientsin, a man of rare personal traits, an avowed Christian gentleman with marked ability for educational work, was persuaded to give a portion of his time to help reorganize the educational scheme. He was formally appointed Dean by the Directors, and immediately began by making a thorough survey of the whole College. He met all the teachers personally, and secured from them suggestions as to necessary steps to be taken to place the work upon a sound educational basis. In many ways pains were taken to inspire confidence that the new regimen would conserve the purpose for which the school was established.

The American teachers were requested to present recommendations as to the best method of selecting students to go to the United States. They replied, "We have come to the con-

clusion that the most important thing now before us is the formulation of proper and just plans for determining upon the students to be sent to the United States this summer. We would suggest that in considering the qualifications of students for entrance into American colleges the following features are of the greatest importance, and will result in the best selection, namely,

1. Past records of scholarship.
2. Present class standing, and
3. A fair general examination.

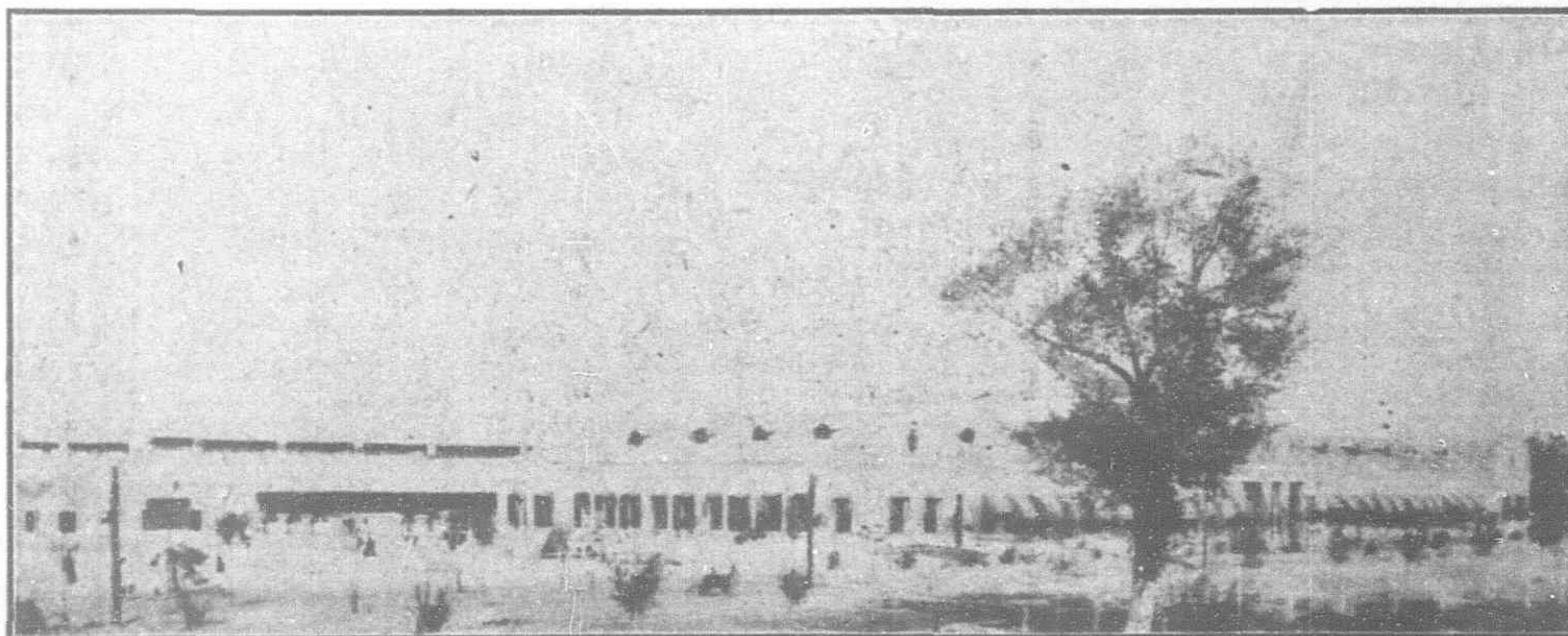
After due consideration the Directors announced that the advanced students would be chosen on the basis of 50% being allowed for their class standings and 50% on a final examination in college entrance requirements. The examinations took place at Tsing Hua College from June 23rd to 29th inclusive. The examination questions were set by the Faculty, and the examination conducted by Bureau officials in a very thorough manner. The questions, on the whole, were about the same as those set for entrance into the best American colleges. The papers were graded by Chinese

scholars, most of whom were returned students from America who held important positions of trust in Peking.

From the 134 advanced students taking this examination, 63 were chosen to go to the United States. With few exceptions these were the best prepared students in the College. The American teachers were satisfied that every effort was made to pick students best qualified to go, although it was felt considerable improvement could have been made in the preparation of some of them had they remained longer in the school. Three of these boys were detained on account of their physical condition; each student being required to pass a rigid physical examination before being allowed to proceed to the States. The successful ones sailed from Shanghai on the s.s. "Persia," August 5th, 1911. They were placed in the leading colleges of the Middle and Eastern States.

At the opening of the College Mr. Tong Kaison was away on a Mission to America and Europe and was compelled to be away during the uncertain months of preliminary organization. Mr. Chow Tze-chi was commissioned to go to the Coronation in England at a most critical time in the initial period of organization.

Under the able leadership of Dr. W. W. Yen, then Acting-Director, and Mr. Chang Po-ling as Dean the policy of the College began to assume definite shape and gave promise of conserving the ideals for which it had been founded. Shortly after Mr. Tong Kaison and Mr. Chow Tze-chi returned a reorganization of the Bureau of Educational Mission to the



Middle School Group of Buildings, Tsing Hua College.

Photo by R. A. Bolt.

Conversation 1	Health Drill 1	 1
Arithmetic 3	Music 1	Elective subject .. 1
Drawing 2	Solid Geometry and Trigonometry .. 4	Required .. 4
Music 2	Elective.	
Health Drill 1	Latin (Elective) .. 5.	Mechanical Drawing 2
	Second Modern Language 5.	Manual Training .. 2

32 hours.

3rd Year.	General Course.	Scientific
Chinese 6	Chinese 3	 3
Reading 5	English Literature .. 3	 6
Grammar & Sentence .. 4	Modern Language .. 5	 5
Diction 2	Mediæval & Modern History 4	 4
Conversation 1	Higher Arithmetic .. 1	 1
Geography 3	Ethics (Lectures) .. 1	 1
Algebra 3	Health Drill 1	 1
Drawing 2	Elective Subjects. Advanced Algebra .. 4	
Manual Training .. 2	Latin (2nd Year) .. 5.	Chemistry 5
Music 2	2nd Modern Elective subject.	
Health Drill 1		

31 hours.

Middle School		High School	
4th Year.		General Course.	Scientific
Chinese	6	Chinese	3.. .. .3
Reading	4	English Literature	5.. .. .5
Grammar & Rhetoric	3	American History..	4.. .. .4
English Composition.	2	Civil Government..	2.. .. .2
Conversation	1	Political Economy	2.. .. .2
General Geography	3	Ethics (Lectures)..	1.. .. .1
Elementary Chemis-		Health Drill	1.. .. .1
try	2	Theme Writing ..	2 Physics ..5
Hygiene	1	Public Speaking ..	1
Algebra	3	Electives.. .. .	3 Electives
Manual Training ..	2	Psychology. Logic..	2 Chemistry 5
Drawing	1	Second Modern	
Music	1	Language, 3rd year	5.. .. .5
Health Drill	1	Analytical Geometry	3.. .. .3
		Mathematical Survey	2.. .. .2
			Music .. .1
	30 hours.		

30 hours.

Statistics of the Bureau of Educational Mission to U. S. A. for 1913.

Tsing Hua College

Number of Chinese Teachers	16
Number of American Teachers	18
Number of Students in Tsing Hua College November 20, 1913.	

High School	Middle School
Senior Class 36	4th Year 56
Junior 45	3rd 50
Sophomore Class .. 37	2nd 44
Freshman 56	1st 72
174	222

Total number of students .. 396.

Number of Students in the U. S. A. on the "Indemnity Fund"

1st Batch	47
2nd	70
3rd	60
4th	19

196

Students taken over on the "Indemnity Fund" as Specials.

Chinese Legation Students	3
Sent by Board of War	2
Sent by the Customs College	2
Sent by the Peiyang College	14

Special Scholarship Students 9

30

\$500 gold—Scholarship Students 32

Girl students taken on to the Fund 4

36

Total Number of Indemnity Students 272.

Total Number of Chinese Students now in the U. S. A. is about 1,000.

Key to Plan of the Tsing Hua College Buildings

- No. 1:—The Main College Building with upper story, of imposing architectural construction, with class rooms, lecture rooms, chemical studies, presidential and secretarial reception and office rooms, all laid out for over 300 students.
- No. 2:—The Li Pai Tang, or festival hall, as well as music study for the students, seating capacity about 400, good acoustic, and airy hall.
- No. 3:—Adjoining the Festival Hall the quarters for the Business Manager of the College and Proctor.
- No. 4:—The temporary Library.
- No. 5:—The Students' rooms in which the students do their preparatory work.
- No. 6:—Ditto (both 5 and 6 are for the High School only).
- No. 7, 8, 9 and 10:—Dormitories for 300 High School students.
- No. 11:—The Large Dining Hall for the east section of buildings with its kitchen, and pantry; part of this dining room is now used as the study room for manual labour.
- No. 12:—The Grammar School class rooms.
- No. 13:—A small hall with adjoining offices.
- No. 14:—The Studies.
- No. 15 to 20:—The dormitories for 300.
- No. 21:—The Dining Hall of the Grammar School students and adjoining kitchen and other buildings.
- No. 22 to 26:—The Sport and Athletic field with tennis courts, basketball grounds, etc.
- No. 27:—The Hospital building in charge of Dr. Bolt.
- No. 28:—The 'Inner River.'
- No. 29 to 42:—Lotus Ponds.
- No. 30:—The old Princely Residence, now generally called "the Yamen" all reconstructed and with fine Great Halls and living quarters of the officials of the College; here is also the central telephone station which connects the three million square feet of extended property of the Tsing Hua College and its various buildings, as well as offices.
- No. 31:—The Chinese Teachers' residential quarters.
- No. 32, 33, 34:—The Residential Houses for the President and Vice-Presidents of the College.
- No. 35:—The South West Entrance (closed).
- No. 36:—The College Grounds Police Head Quarters.
- No. 37:—The Main Entrance Gate (Archway) with road to the Peking-Kalgan Railway Station, which is ten minutes off.
- No. 38:—The Post-office and Porter Quarters, as well as stables.
- No. 39:—The Electric Light station giving current, for 2,000 electric incandescent lamps.
- No. 40 and 41:—The wooded hills in the old Princely Park.
- No. 42:—Lotus Pond.
- No. 43:—The Club of the American Professors and Teachers.
- No. 44 to 51:—The Residential Buildings and section of the homes of the American teachers engaged by the Tsing Hua authorities directly from the States. Each building has a double residential section with sunny rooms and verandahs, Dining and Sleeping Rooms and Parlor. Most of these buildings face the pretty panorama of the Western Hills, with the Great Summer Palace in front, the Precious Stone Pagoda, and so on.

PHILIPPINE LUMBER CONCESSION

The Governor-General of the Philippines has granted to the Kolambagan Lumber Company a concession to cut two billion feet of merchantable lumber in the Moro province, the concession to run for twenty years. The area comprises 100 square miles and the capital is furnished by the Millars Karri Lumber Company, the largest firm of lumber dealers in the United Kingdom, which has for many years had huge lumber concessions and holdings in the south-western part of Australia.

THE HWAI RIVER CONSERVANCY SCHEME

TEXT OF THE AGREEMENT

The following is the text of the Memorandum communicated on January 30 last by the Chinese Government to the American Red Cross Society:—

Hwai River Conservancy Memorandum addressed by the Government of the Republic of China to the American National Red Cross, or its representatives, or successors.

I. In consideration of the interest already practically manifested by the American National Red Cross in the Hwai River region, and in consideration of the readiness of that organization and its representatives or successors to take steps with a view to obtaining the funds for carrying out the engineering works of the Hwai River Conservancy,

II. The Government of the Republic of China engages itself to allow the American National Red Cross, or its representatives, or successors, a period of one year from date for the purpose of preparing and effecting a Hwai River Conservancy Loan. The amount of this Loan is to be Twenty Million Gold Dollars (\$20,000,000), or such sum as may be found necessary, after complete surveys have been made, to carry out the work of improving the water courses embraced in the Hwai River district, including the Hwai River from Hsin-yang-chow, in Honan, passing through Hsi-hsien, Hou-ch'iu-hsien, Feng-t'si-hsien, Huai-yuan-hsien, Wu-ho-hsien, and Yu-i-hsien, the Inner Grand Canal, the Yi, Ssu, and Shu Rivers, in the province of Kiangsu, the Sui, Ko, Fei, K'uai, Ch'ung, T'ung and T'o Rivers, in the province of Anhui, and the Hungtzu Lake, together with the contemplated outlets to the sea and the Yangtze River. If after the above conservancy work has been in progress for some time, it shall appear that the original loan is insufficient to provide for its completion, then, after complete investigations as to the requisite amount have been made by the Engineer-in-Chief, the Director General of the National Conservancy Bureau, upon approving the report submitted by the Engineer-in-Chief, shall approach the American National Red Cross, who will continue to use their good offices for increasing the loan, on terms mutually satisfactory at the time of such increase, to such an amount as will render possible the completion of the Hwai River Conservancy works as herein delimited.

III. The Loan shall be a Government of the Republic of China Gold Loan, bearing interest at the rate of five (5) per cent. per annum and shall be secured as follows:

(a) All government revenue derivable or now derived from government lands in the Conservancy Area as defined in Article II. and Appendix A, and also all additional revenues which may in the future accrue to the Government of the Republic of China as a result of the conservancy work, which shall include revenue from the sale or lease of reclaimed lands, as well as special conservancy, taxes, to be levied by the Government of the Republic of China on all lands benefited by the Conservancy work; also all tolls levied for the use of the Grand Canal within the Conservancy Area.

(b) Should the above revenues and taxes derived by the Government of the Republic of China be insufficient to meet the payments of the interest and principal of the loan when they fall due, the Government of the Republic of China undertakes to repay in full both principal and interest on their due dates, with revenue derived from other sources.

IV. The issue price of the bonds shall be fixed by agreement between the Government of the Republic of China and the American National Red Cross, or its representatives, or successors, in accordance with the most favourable market price of the similar obligations of the Government of the Republic of China, such as bonds for railway construction, at the time of signing the loan contract. The price payable to the Government of the Republic of China shall be the actual rate of issue to the public less an equitable amount for bankers' commissions, flotation charges, and stamps.

V. The Government of the Republic of China expresses its desire to trust the American National Red Cross to secure an engineer of at least five years' experience in the United States in river conservancy work of the first magnitude and of the highest professional reputation, for the post of Engineer-in-Chief of the Hwai River Conservancy work, who shall be entrusted with the preparation of definitive plans for the engineering work and shall be in charge of all the works in the Conservancy Area as defined in paragraph II and delimited in Appendix A. As an evidence of its good intention to assist the Republic of China the American National Red Cross shall designate for appointment by the Government of the Republic of China, an engineer possessing the qualifications desired by the Chinese Government as stated above. In order to give evidence of American fairness and strengthen the confidence felt in the Chinese Government any consulting engineer representing the Director General of the National Conservancy Bureau who shall be under orders to inspect the progress of the works of the Hwai River Conservancy and the other conservancy works in the Conservancy Area as delimited in Appendix A, shall be afforded reasonable facilities for such inspection, in the same way that he is assisted in the inspection of all the other works undertaken by the National Conservancy Bureau.

VI. The construction work shall be carried out under a percentage contract, and the construction company selected to carry out the work shall have the approval of the Government of the Republic of China and of the American National Red Cross, or its representatives or successors. All sub-contracts of a nature to be specified in the Final Agreement, which may be let out by the Construction Company for the prompt prosecution of the work, are to be made on the basis of public tender.

VII. If within the Hwai River Conservancy Area there are engineering works of lesser magnitude that, either from the standpoint of conservancy or water communication, demand immediate action and necessitate the preliminary advance of one or two million dollars gold, then the American National Red Cross, or its representatives or successors, actuated by a friendly purpose to assist China, agrees to use its good offices, after receiving the representations of the Government of the Republic of China, to secure at the earliest possible moment an advance to the amount required, said advance to be repaid from the large loan when made.

VIII. All arrangements for the efficient handling of disbursements and receipts and for the mutual protection of the Government of the Republic of China and the bondholders shall be settled by negotiation and embodied in the Final Agreement. General lump sum appropriations from the proceeds of the loan must first receive the sanction of the Director General of the National Conservancy Bureau but all payments made therefrom shall be made only upon joint approval by the Managing Director and the Engineer-in-Chief.

IX. As soon as possible after the signing of this Memorandum the two parties shall appoint delegates with full powers to negotiate and conclude a Final Agreement subject to the approval of their principals. When the expiration of the time covered by this Memorandum has arrived should either party thereto be unable to fulfil its engagement it shall become of no effect.

X. The English and Chinese texts of this Memorandum have been carefully compared; but in the event of there being any difference of meaning between them, the sense as expressed in the English text shall be held to be the correct one.

Appendix A.

The Hwai River Conservancy Area shall include the following water courses, together with such subsidiary works as according to the final plans of the Engineer-in-Chief shall be necessary for the proper working of the whole system:

HWAI RIVER

Starting from Hsin-yang-chow, in Honan, it proceeds through Hsi-hsien, Hou-ch'iu-hsien, and Feng-t'ai-hsien to Huai-yuan-hsien, uniting the following rivers: Sui, Ko, Fei, K'uai, Ch'ung, T'ung, and T'o: it passes through Wu-ho-hsien and Yu-i-hsien, to the Hung-tzu Lake; it subsequently passes through Ch'ing-ho-hsien and An-tung-hsien to the sea.

INNER GRAND CANAL

Starting from Kua-chow on the Yangtze it proceeds to Ch'ing-ho-hsien and joins the Grand Canal.

YI RIVER

Starting from Ch'i-ts'un it proceeds to Yao-wan, where it enters the Grand Canal.

SAN RIVER

(Also called the Pu-lao River)

Starting from Lin Chiao Pa it goes to a place between Yao-wan and Hsu-t'ang, where it enters the Grand Canal.

SHU RIVER

Starting from Ta San Ch'a K'ou it goes eastward to Chou Chia K'ou, where it enters the Lin T'ang River.

(This portion is known as the "Ch'ien, Anterior, Shu River.")

Arriving at Lung Wang Miao it makes a turn to the North and proceeds to Ma Chia K'ou and enters the Ch'ing Yi Lake. (This portion is known as the "Hou, Posterior, Shu River.")

For purposes of the security for the loan under paragraph III, the area shall also include the entire drainage area of the above mentioned water-courses.

Signed at Peking, China, this thirtieth day of January, one thousand nine hundred and fourteen:

Accepted on behalf of the American National Red Cross.

Signed: PAUL S. REINSCH.

Envoy Extraordinary and Minister Plenipotentiary of the United States of America

For the Government of the Republic of China.

Signed: (In Chinese by CHANG CHIEN)

Seal of the Ministry of Agriculture and Commerce.

Seal of CHANG CHIEN as Director-General of the National Conservancy Bureau

MINING IN THE PHILIPPINE ISLANDS

"The noteworthy features of the mining industry in the Philippines during the past," says Mr. Warren D. Smith, in his review of the mineral resources for the year 1912, "are the signal success of the Colorado mine in Masbate, a gold-quartz property; the installation and very successful operation of the Gumaus gold dredge on the river of that name in the Paracale district; the erection of a small, but modern, cupola for iron smelting in the Angat iron region; the highly successful utilization of Philippine coal in a gas producer at the Bureau of Science and the completion of a geologic survey of the lower end of the Bondoc Peninsula, Tayabas Province, a district which is already well-known on account of its seeps of exceptionally high-grade petroleum.

FOUR DREDGERS AT WORK

"That branch of mining devoted to the winning of gold has been very active, and shows very promising results. Besides the marked success of the Gumaus dredge already mentioned, there are three other dredges operating in the vicinity of the Paracale River, with two more building, and a third is scheduled to begin operations on the lower Umirai River in September of this year (1913). The flotation of the Cansuran Placer Company for hydraulicking the goldbearing gravels on the river of the same name focuses attention once more on the Surigai Peninsula, long well-known as being fairly rich in gold. The thorough resuscitation of the promising mineral district of Masbate is indicated by the beginning of the erection of mills for the Eastern and Keystone properties. The Benguet district remains in a badly crippled condition, and, with the exception of the Headwaters mine and the Camote mines which are still (June, 1913) running operations are practically at a standstill. An increase for the year of nearly a million pesos in gold production in the Archipelago is a remarkable showing in the early stages of the industry. It means much more now than were it simply another million added to a production of several millions already existing. Those who have been the most active, the promoters and operators, have a right to feel proud of their efforts.

NO SUCCESSFUL COAL MINE

"During the past year, the East Batan coal mine, which had been operating fairly continuously for five years, went into the hands of a receiver and was eventually sold to the Government to satisfy its preferred indebtedness. With the exception of a little grubbing by the natives and some exploratory work in Cebu, there is nothing further to be said about the coal industry. It seems to be peculiarly strange that with so much coal occurring in the Archipelago no successful mine has been started.

"In copper there is nothing new to be noted, although there seems to be a renewed interest, judging from the requests for information.

"The most important field work carried on by the division of mines, of the Bureau of Science during the past year has been the geologic survey of the Bondoc Peninsula, Tayabas. The structure of the region appears to be very favorable for the accumulation of commercial quantities of petroleum, and plans are being projected leading to exploration of the field by drilling.

WOLFRAMITE DISCOVERY

The discovery of the mineral wolframite has been reported from Antique Province, Panay. A specimen in the provincial exhibit of Antique at the last Philippine Exposition proved to be wolframite, and thus tends to confirm the reports.

A deposit of gilsonite, one of the mineral pitches, in a vein about 6 meters wide, is reported as having been found in Leyte. Samples of this substance, collected by persons of undoubted good faith, have been received at this office.

What may prove to be large deposits of chromic iron and copper have been located in Antique Province, Panay.

The successes and failures of the past year, as well as of preceding years, have clearly demonstrated:

First, that this is not a mining country for a poor man and that any gold rush or any other kind of a mining boom would lead to a great number of bitter disappointments.

Second, the superiority of careful investigation by technically trained men to the guess work and "rule of thumb" methods of many so-called "practical miners."

Third, that there is a legitimate mining industry here which, if properly fostered, will yield in time a large return both to private investors and the Government.

REFORM OF CHINA'S CURRENCY

The National Currency Law for China was promulgated by Presidential Order on February 7. Some slight alterations were made in regard to the weight of the subsidiary silver coins.

The following is the weight and fineness of the coins according to the law as promulgated:—

1. One yuan, gross weight 72 candareens with 90 per cent silver and 10 per cent copper.
2. 50 cent piece, gross weight 36 candareens with 70 per cent silver and 30 per cent copper.
3. 20 cent piece, gross weight 1.44 candareens, with 70 per cent silver and 30 per cent copper.
4. 10 cent piece, gross weight 7.2 candareens with 70 per cent silver and 30 per cent copper.
5. 5 cent nickel piece, gross weight 7 candareens with 25 per cent nickel and 75 per cent copper.
6. 2 cent copper piece, gross weight 28 candareens, with 95 per cent copper, 4 per cent pewter and 1 per cent lead.
7. 1 cent copper piece, gross weight 18 candareens, with its fineness same as 2 cent copper piece.
8. 5 li copper piece, gross weight 9 candareens with its fineness same as above.
9. 2 li copper piece, gross weight 4.5 candareens with its fineness same as above.
10. 1 li copper piece, gross weight 2.5 candareens with its fineness same as above.

THE ADMINISTRATION OF THE SALT GABELLE

TEXT OF THE REGULATIONS

The regulations regarding the Chief Inspectorate, the District Inspectorates and the Advisers to the Salt Administration of China have been promulgated. We give a translation of the text:—

Regulations for the Chief Inspectorate of the Salt Administration

Art. I.—These regulations are drawn up in accordance with the provisions contained in Article V of the Chinese Government Reorganization Loan Agreement, signed on April 26, 1913. All officials in the Salt Gabelle and subordinate departments shall observe them.

Art. II.—As stipulated in Article V of the Reorganization Loan Agreement the Chief Inspectorate shall form an integral part of the Central Salt Administration.

a.—In the Chief Inspectorate there shall be one Chinese Chief Inspector and one Foreign Associate Chief Inspector. The post of Chinese Chief Inspector shall be held by the Head of the Central Salt Administration, and the post of Foreign Associate Chief Inspector shall be assumed by the Adviser of the Central Salt Administration. When the Associate Chief Inspector is on leave, or absent from duty, the Deputy Associate Chief Inspector shall act both as Associate Chief Inspector of the Inspectorate and Adviser to the Administration.

b.—The Chinese Chief Inspector, and the Foreign Associate Chief Inspector shall supervise the issuing of licenses and the compilation of reports and returns of revenue.

c.—With the exception of the Chinese and Foreign Chief Inspector, and the Deputy Associate Chief Inspector, who shall be appointed by the Minister of Finance, all other members of the Chinese and foreign staffs in the Chief and the District Inspectorates shall be engaged or dismissed by the Chinese and Foreign Chief Inspectors with the approval of the Minister of Finance.

d.—The funds as recorded in the Chinese Salt Gabelle shall only be drawn under joint signature of the Chief Inspector and Associate Chief Inspector.

e.—All accounts of the receipts and disbursements of the Salt Revenue, including receipts and payments on account of the purchase, storage, transportation and sale of salt on behalf of the Government shall be audited by the Chief Inspectorate, who shall publish quarterly reports of such receipts and disbursements after submitting them to the Minister of Finance for approval.

f.—The protection of the priority of the several obligations secured upon the salt revenues shall be the duty of the Chief Inspectors.

Art. III.—In addition to the duties described above the Chief Inspectorate shall control the District Inspectors in the discharge of the duties as defined in the regulations for the governing of District Inspectorates.

Art. IV.—In discharging the duties described in the foregoing articles the Chief Inspector and the Associate Chief Inspector shall be subject to the direct control of the Minister of Finance.

Art. V.—All orders of the Chief Inspector and Associate Chief Inspector shall be issued in the name of the Minister of Finance, under the seals of the Minister of Finance and the Chief Inspectors, and shall be approved by the Minister of Finance before they are issued.

Art. VI.—If disagreement arise between the Head of the Central Salt Administration and Chinese Chief Inspector and the Foreign Adviser they shall refer the matter to the Minister of Finance for decision.

Art. VII.—The Chief Inspectors shall have the right of appointing, dismissing and controlling the Chinese and foreign District Inspectors and the staff of the District Inspectorates, but before exercising these powers they shall have the approval of the Minister of Finance and the orders of appointment or dismissal shall be submitted to the Minister of Finance.

Art. VIII.—The Chief Inspectorate shall design the forms of accounts and tables for recording the different items of the receipts and payment of salt revenues and also forms for the receipts, licenses, certificates, vouchers, etc., to be used in the District Inspectorates, and shall submit them to the Minister of Finance for inspection.

Art. IX.—The duties of the Chinese and foreign District Inspectors shall be provided for in the regulations for the control of the District Inspectorates. The monthly salaries and travelling expenses of District Inspectors shall be regulated by the Chief Inspectorate and shall not be increased without the sanction of the Minister of Finance.

Art. X.—The Head of the Central Salt Administration may at any time examine the documents in the Chief Inspectorate and the Chief Inspector and Associate Chief Inspector may examine the documents of the Central Salt Administration whenever required.

Art. XI.—The number of the members of the staff of the Chief Inspectorate shall be decided by the Chief Inspector and Associate

Chief Inspector with the approval of the Minister of Finance, and increase in either staff or salaries shall be made without the sanction of the Minister of Finance. Within the limits prescribed by the Minister of Finance the Chief Inspector and the Associate Chief Inspector shall have the power of appointing and dismissing members of the Chinese and foreign staff of the Chief Inspectorate. These powers may be exercised only after permission is given by the Minister of Finance and the names reported to him. A fixed monthly allowance for office expenses may be drawn by the Chief Inspectorate, the amount to be fixed by the Minister of Finance in accordance with requirements. At the opening of each fiscal year the Chief Inspectorate shall compile a Budget of current expenses required within the year and submit it to the Minister of Finance. At the end of each fiscal year a statement of actual payments during the year shall be compiled and submitted to the Minister of Finance for approval.

Art. XII.—All affairs of the Central Salt Administration not described in the foregoing articles or in the revised regulations which may be hereafter issued shall be conducted by the Head of the Central Salt Administration with the assistance of the Foreign Adviser. Copies of all orders issued by the Head of the Central Salt Administration except those on routine business shall be communicated to the Chief Inspectorate.

Regulations for District Inspectorates of the Central Salt Administration

Art. 1.—All the District Inspectorates shall be under the control of the Chief Inspectorate of the Central Salt Administration which is under the direction of the Ministry of Finance. The District Inspectors shall obey the orders and follow the direction of the Chinese and foreign Chief Inspectors in performing their duties.

Art. 2.—In accordance with Art. V of the Reorganization Loan agreement, a branch office of the Chief Inspectorate shall be established in each salt producing district. In this branch office there shall be one Chinese and one foreign District Inspector who shall be of the same rank and with equal authority and their duties are described as follows:—

a.—The Chinese and foreign District Inspectors shall superintend conjointly the issue of licenses or permits authorizing the transportation of salt on the payment of duty, and shall collect all duty, fees, and salt dues in places where the District Inspectorate is established. They shall also supervise the collection of all duty, fees and salt dues at other places. The officials employed to collect duty at such places shall be appointed by the Chief Inspector and shall be responsible to the District Inspectorate for the duty collected.

b.—The release of salt after the payment of dues in any district will be made upon producing the documents bearing the joint signatures of the Chinese and foreign District Inspectors or the seal of the District Inspectorate. The officials in charge of the weighing or the release of salt from the salt depots shall be the subordinate staff of the District Inspectorate. The District Inspectors and their subordinate staff in charge of the weighing and release of salt shall see to it that all the salt released from the depots is covered by a proper permit, that the duty has been paid in full, and that only the quantity stipulated is to be released. The District Inspectors shall inspect periodically the salt works and salt depots within their district. If the local Salt Commissioner or any of the staff at salt offices disregard any regulations, the District Inspectors shall report the matter to the Chief Inspectors, and any case of illegal manufacture or smuggling of salt from the licensed salt works or salt depots, which they may discover in the course of their inspection, shall also be reported to the Chief Inspectors. In places where salt is purchased, stored, transported and sold on behalf of the Government, the duties of the District Inspectors in connection with the purchase, storage, transportation and sale of salt, shall be fixed by the Central Salt Administration.

c.—The District Inspectors shall lodge all salt revenue collected in a Chinese Government Salt Revenue Account with the group banks or with the depository approved by the said banks, and their sums shall be reported to the Chief Inspectorate for comparison with the returns from the District Inspectorate of the quantity of salt issued and with the returns from the said bank of the amount of revenue received.

d.—The Chinese and foreign District Inspectors shall report in full all receipts and disbursements of the salt revenue to the local salt commissioners and to the Chief Inspectorate in Peking.

e.—The Chinese and foreign Chief Inspectors may decide jointly upon the appointment and dismissal of any member of the Chinese and foreign staff of the District Inspectorate with the approval of the Minister of Finance.

Art. 3.—The number of the staff in each District Inspectorate shall be determined from time to time in accordance with the amount of business transacted. The Chief Inspectors shall make a report of the details regarding the staff to be employed and submit it to the Minister of Finance for approval.

Art. 4.—The District Inspectors shall submit a statement to the Chief Inspectors in regard to any doubtful point concerning the matters described in Art. 2 of this regulation and ask for instructions and await the decision. In matters of supreme importance the Chief Inspectors shall consult the Minister of Finance and abide by his decision.

Art. 5.—Should there be any dispute between a District Inspector and a local Salt Commissioner, in regard to their respective powers, duties and responsibilities, the matter shall be submitted by the Head of the Central Salt Administration and the Chief Inspectors of the Chief Inspectorate for the decision of the Minister of Finance.

Art. 6.—All accounting forms for the receipts and vouchers, licenses, certificates, etc., used in the District Inspectorate shall be prepared in conformity with the designs and instructions issued by the Chief Inspectorate.

Art. 7.—The District Inspectorate shall prepare at the beginning of each fiscal year a budget of its expenditures and send it to the Chief Inspector who shall submit it with that of the Central Salt Administration to the Ministry of Finance for examination and compilation.

Art. 8.—When the District Inspectorate finds it necessary to make inquiries about any item of the salt revenue, the number of licenses issued or any matter connected with the administration of the revenue, the District Inspector may write and request the local Salt Commissioner to hand over the documents concerned for inspection or they may send officials to the head office after consulting him to inspect the documents there. When the Salt Commissioner desires to know anything about the District Inspectorate, he may request the District Inspectorate to do the same.

Supplementary Articles

Art. 1.—If there be any matter which has not been provided for in these regulations in regard to the duties of the Chief and District Inspectorates, or if there should arise any necessity in the future for revising the regulations, the Chief Inspector and the head of the Central Salt Administration shall submit the particulars of the same with their proposals to the Minister of Finance. The necessary amendments and additions will then be made and the revised regulations will be promulgated by the Order of the Minister of Finance.

Art. 2.—These regulations shall be effective from the day of their promulgation by the Order of the Minister of Finance.

Art. 3.—From the day of the promulgation of these regulations, the old regulations made by the Central Salt Administration Preparation Bureau shall be abrogated.

Regulations for the Appointment of A Foreign Adviser in the Central Salt Administration at Peking.

Art. I.—These Regulations are made in accordance with the Chinese Government Reorganization Loan Agreement signed in Peking on April 26, 1913, or on the same date and same month of the second year

of the Republic of China, and in which it is provided that "The Chinese Government engage to take immediate steps for the reorganization with the assistance of foreigners of the system of collection of the salt revenues of China assigned as security for this Loan." As provided in the regulations for governing the working of the Chief Inspectorate, the Associate Chief Inspector, and during his absence from duty, the Deputy Associate Chief Inspector shall be the Adviser of the Central Salt Administration.

Art. II.—The duties and the authority of the said Adviser are defined as follows:—

1.—Before any reorganization is effected of the existing system of salt administration and before any contract is concluded or any orders of importance are issued regarding the salt revenue and the transportation of salt to different localities for consumption (the official transportation, merchant's transportation and transportation by the public at large being included) the said Adviser shall be consulted by the Head of the Central Salt Administration, and the nature of the decision to be arrived at and of the orders to be issued shall be determined by the Head of the Central Salt Administration in personal discussion with or in correspondence with the said Adviser. A copy of every order issued by the Head of the Central Salt Administration which do not fall within the scope of the duties of the Chief Inspectors shall be communicated to the said Adviser for information. In particular the Adviser shall be consulted in regard to—

(a)—The arrangements for the supply of salt for consumption in the different provinces and localities and reforms which may be necessary in those arrangements.

(b)—The methods of collection and deposit in the Chinese Government Salt Revenue Account of duties, dues and payments of every description connected with salt, and the expenditure connected therewith.

(c)—The arrangements for the purchase, storage, transportation and sale of salt on behalf of the Chinese Government and the relations which are to exist between the officers in charge of these arrangements and the District Inspectors and Chief Inspectors appointed under the loan agreement.

2.—From time to time the Minister of Finance may instruct or the Head of the Central Salt Administration may request the said Adviser to devise measures for the improvement of the Salt Administration.

3.—When any meeting is held by the Salt Administration to discuss questions with regard to the Salt Administrative work, the said Adviser may participate in the discussions.

4.—If so ordered by the Minister of Finance, the said Adviser shall visit different places to inspect the conditions of the Salt Administration. He is expected to exercise scrupulous care in the work of inspection or the discharge of duties, and at the end of a visit of inspection to each place he shall prepare a detailed report in duplicate, one copy to be submitted to the Minister of Finance and the other to be kept for reference by the staff of Central Salt Administration.

Art. III.—If the said Adviser and the Head of the Salt Administration are unable to agree on any point which is under consideration or discussion the matter shall be referred to the Minister of Finance for decision.

Art. IV.—All important orders and documents pertaining to the Salt Administration shall be sent to the said Adviser for perusal and for discussion when necessary with the Head of the Central Salt Administration.

Art. V.—Should the said Adviser wish to peruse any of the archives, documents and reports of the Central Salt Administration he may submit requisition for the papers required and the head of the Salt Administration will instruct the official in charge of such archives, etc., to produce them.

STANDARDIZED SYSTEMS OF ELECTRICITY FOR CHINA

We are in receipt of the following letter from the Secretary of the Electricity Standardization Committee of Shanghai:—

To the Editor of the FAR EASTERN REVIEW.

SIR,—At a recent meeting of the Engineering Society of China it was decided to appoint a committee to consider and discuss the question of the standardization of system or systems of electricity supply in China with a view to placing recommendations before the proper Government authorities, officials of Foreign Settlements, holders (present and prospective) of concessions for the supply of electricity, and the various engineering firms concerned. In view of the multiplicity of voltages, frequencies and systems in use in other countries it seemed both desirable and possible to choose a single low tension system for domestic supply and one or a relatively few systems for generation and transmission.

It may possibly be found that a single L. T. system may be too ideal in aim, but it is the object of the Committee to reduce, in any case, the alternatives to the absolute minimum, bearing in mind that the cost of mains should be kept down to the lowest value consistent with efficiency; which means that use must be made of the highest L. T. pressure consistent with safety in operation.

If the Committee succeed in obtaining official recognition (and there is every prospect that it will) of a single L. T. system, the following advantages will be secured.

(1) Buyers of electrical plant will receive tenders on a comparable basis.

- (2) The possibility of interconnecting different systems and the consequent use of large bulk supplies, which is almost impossible in many of the larger European cities.
- (3) Minimizing the variety of electrical stock, such as lamps, meters, motors, transformers, and general supplies, kept at the trading centres.
- (4) The interchangeability of consumers' appliances.

The Committee hopes that the publication of this letter in the various electrical journals of Europe and America will lead to such discussion and support that will assist them in their work.

Thanking you in anticipation,

I am, etc.,

R. A. WILLIAMS,
Secretary,

Electricity Standardization Committee.

Shanghai, Feb. 16

MESSRS. BUTTERFIELD AND SWIRE

The well-known firm of John Swire and Sons, Limited, has been registered with a capital of £500,000, in £100 shares. Objects: To take over the businesses carried on under the styles of John Swire and Sons, in London, and Butterfield and Swire in Hongkong, China, and Japan, and to adopt an agreement with J. Swire, G. W. Swire, C. C. Scott and the executors of the late J. H. Scott. The signatories are:—J. Swire, G. W. Swire, C. C. Scott, J. K. Swire, Mrs. M. Swire, A. G. Swire, and J. M. Scott. Private company. The first directors (to number not less than two nor more than seven) are: J. Swire, G. W. Swire and C. C. Scott (all permanent.) Qualification, 25 shares. Registered office, 8 Billiter square, E. C. The business of the company in the East will continue to be carried on under the style of Butterfield and Swire.

AGREEMENT FOR THE EXPLOITATION OF THE NORTH CHINA OIL FIELDS BETWEEN THE GOVERNMENT OF CHINA AND THE STANDARD OIL COMPANY

The following is the text of the Agreement between the Government of the Republic of China and the Standard Oil Company of New York for the exploitation of oil fields in Shensi and Chihli:—

This Agreement made this 10th day of February 1914 at Peking, China, by and between the Republic of China represented by:—

HSIUNG HSI-LING	Premier
CHOW TSZ-CHI	Minister of Finance
CHANG CHIEN	Minister of Agriculture and Commerce
CHU CHI-CHIEN	Minister of Communications

and the Standard Oil Company of New York, an American Corporation represented by their Attorney HENRY J. EVERALL,

Witnesseth as follows:—

Whereas Petroleum is known to exist at Yen-ch'ang and other places in Shensi and other Provinces, and whereas the nature, extent, and value of the said petroleum deposits are not fully known, and whereas the Standard Oil Company of New York is one of the most experienced Corporations in the Petroleum Trade, and has facilities at its command superior to any existing organization for exploiting, preparing for consumption and marketing,

Now therefore, we the above contracting parties do hereby solemnly agree:—

1.—The Standard Oil Company of New York will send a thoroughly competent expert, or experts, at once to make a thorough examination of the Yen-Ch'ang Yen-An-Fu and adjoining fields in Shensi Province and Chengtehfu (Jehol) and adjoining fields in Chihli Province. The Government of China will provide all necessary escort, interpreters, and military sufficient to insure the safety of the expedition. Expenses are to be borne by the Standard Oil Company of New York and the Chinese Government jointly.

2.—Upon completion of the examination or at such time in the course of examination when in the opinion of the expert, or experts, sufficient data have been procured to show that the contracting parties can work to advantage the Petroleum fields of Yen-Ch'ang, Yen-An-Fu or Chengtehfu then an American-Chinese Corporation shall be formed comprising both American and Chinese shareholders. The said Corporation is to be chartered in the United States of America and registered in China, and shall begin operating the fields within six months after completion of the survey.

3.—The Capitalization shall be 55 per cent. Standard Oil Company of New York and 37 1/2 per cent. Chinese Government, this 37 1/2 per cent. to be in payment by the American-Chinese Corporation to the Chinese Government for the Franchise. It shall be optional with the Chinese Government to purchase the remaining 7 1/2 per cent. at par within two years from formation of the Corporation. In the event of failure to take up this option, the ownership of this 7 1/2 per cent. remains with the Standard Oil Company of New York. None of the Chinese owned shares mentioned above may be either sold to or owned by other than Chinese during the life of this agreement. Any increase of original capital necessary to work the Petroleum fields mentioned in clauses one, two and four shall be in the same proportions and on the same terms. The absolute and entire control and management of the said American-Chinese Corporation shall be vested in a board of Directors consisting of members of the Standard Oil Company of New York and Chinese in the proportion of the above allotment of shares. The name of the said American-Chinese Corporation, composed as above, shall be mutually arranged between representatives of the Chinese Government and the Standard Oil Company of New York, as well as rules and by-laws governing the same, as soon after the signature of this Agreement as possible. Chinese citizens may purchase shares in the American-Chinese Corporation on the open market.

4.—The Chinese Government hereby promises the Standard Oil Company of New York that the working of Petroleum in the Yen-ch'ang, Yen An-fu and adjoining fields in Shensi Province and Chengtehfu (Jehol) and adjoining fields in Chihli Province shall be exclusively entrusted to the American-Chinese Corporation mentioned above, to develop, refine and market, and that the Chinese Government will give every assistance and protection in doing the same and furthermore will undertake not to give monopolies of Petroleum territories to any other foreigners, but agrees that no concession whatever for petroleum-bearing properties in China be given to other foreigners until the proposed Corporation's workings prove satisfactory to the Chinese Government and the Standard Oil Company of New York, which period shall not exceed one year from date of signing contract.

This Agreement is for sixty years from the date of signature, during which term the Chinese Government promises that no other foreign individual or Corporation will be allowed to produce Petroleum or any of its products in the said districts.

In the event of the Yen-ch'ang, Yen An-fu, Shensi Province or Chengtehfu (Jehol) Chihli Province Fields proving worthless this agreement shall apply to any other district in Shensi or Chihli which the aforesaid experts shall on examination approve.

5.—The Chinese Government promises that all necessary facilities of transportation of Petroleum or its products from point of production to tidewater, such as railway lines or pipe-lines, shall be granted the said American-Chinese Corporation, which Corporation shall construct, maintain and operate such lines in the interest of the said Corporation. Application for same to be made before construction to Board of Communications.

6.—The Chinese Government will arrange with all landowners, or lessors of land, or present workers of Petroleum deposits in the above mentioned fields, that all such petroleum-bearing lands shall be worked by the American-Chinese Corporation aforesaid, and by none other.

All expenses in connection with vacating of any lands for this purpose will be arranged by the Chinese Government, but be paid for by the American-Chinese Corporation.

Royalty on value of Crude Petroleum is not to exceed 1.5% at place of production.

7.—The terms of this Agreement as above are dependent entirely upon the acceptance of same by the Standard Oil Company of New York after the examinations and reports by the experts deputed to investigate.

8.—Should the Chinese Government undertake to arrange for a loan with bankers in the United States the Standard Oil Company of New York agrees to give such loan its tacit support.

9.—This Agreement is drawn up in quadruplicate in the English and Chinese languages. In the event of dispute as to meaning the English version shall be considered binding.

Signed and Sealed at Peking this 10th day of February 1914.

PROGRESS OF THE SCHMIDT SUPERHEATER

The influence of the Schmidt superheater has been so far-reaching that it may be considered one of the most remarkable factor in modern locomotive development. Superheating was not in itself new when Dr. Schmidt commenced dealing therewith in the 'nineties, but whereas most earlier proposals—few of which attained practical trial—were of smokebox type and depended mainly upon waste heat, he insisted from the first that high degree superheat was necessary to realise results of real value. This meant that many practical problems were involved which had not applied to previous experiments, and with the original engines placed in service on the Prussian State Railway in 1898, much pioneer work had to be done, including the design of pistons, piston valves, stuffing boxes, and other parts to meet the conditions created by the high temperature of the steam.

Eventually the initial difficulties were overcome and the value of the appliance conclusively shown. Further engines were equipped in Prussia, and other experimental installations followed in Russia, Belgium, Canada, and the Cape Government railways. The apparatus then employed was of the smokebox type, with a large flue for conveying furnace gases directly to the smokebox. This design was not, however, used for many engines, and it was soon superseded by the original "firetube" apparatus, which was first adopted by Mr. J. B. Flamme in 1902 on the Belgian State Railway. This form included two elements in each large firetube and a two-fold steam path only; but it was applied to numerous engines in various countries and rendered conspicuous success.

But although in this form the apparatus realised a reasonable degree of acceptance and a considerable number of engines of all nationalities and types were equipped therewith, progress was still somewhat slow, except on the Prussian State lines. Then in due course the design was further modified to include the characteristic double-looped tubes, giving a four-fold steam path, and it is this form which has obtained acceptance all over the world. Repeat and additional orders followed, until in 1910 a total of 5,000 engines had been reached. Progress then became much faster, 10,000 being recorded in September, 1911, 15,000 in January, 1912 and 20,000 in January, 1913.

At the present time on the German railways 6,091 engines are provided with such superheaters; in France there are 1,773; and in the English Colonies 2,810. In Great Britain there are nearly 800 engines so fitted, and in Russia well over 900. Austria has nearly 800, Belgium nearly 700, Italy nearly 600, and the United States nearly 8,000. Other countries have less numbers, more or less, in proportion to their sizes. Altogether 435 railway administrations have Schmidt superheaters in use. This as we have already said, is a very remarkable result for ten years' work. It is only four years since the fitting of the 5,000th engine was celebrated in Cassel, and it is confidently expected that before another five years have passed the 100,000th engine will have been supplied with the Schmidt superheater! These figures relate to the Schmidt superheaters only.

Mr. G. J. Churchward, Great Western Railway, was the first to introduce it in the United Kingdom, though he has since used his own moderate-superheat design. Mr. Hughes (Lancashire and Yorkshire) followed, and the Great Northern and London Brighton and South Coast Railways were soon after concerned with trial equipments. On these three lines the Schmidt apparatus has been largely used ever since, and the list of railways now employing it includes virtually every important line, and several smaller ones in the kingdom, from the London and North-Western, where it is systematically employed by Mr. Bowen Cooke for almost all new engines, passenger and goods, to the County Donegal Joint Committee, where it is applied to narrow gauge tank engines.

It is incorporated, almost without variation, in the designs of hundreds of engineers; yet in not one single known instance has the Schmidt apparatus been removed from an engine on account of inefficiency, or because of dissatisfaction or difficulties.

The original British financial support was withdrawn partly in consequence of the liquidation of Messrs. Easton and Anderson, who at first held the patents and were to some extent responsible for development as far as British influence was concerned. Later, control was centralised in Cassel, under the supervision and technical direction of Dr. Schmidt, in the form of the Schmidt'sche Heissdampfgesellschaft G. m. b. H., but the British company has been an important factor in development all along. American interests are controlled by the Locomotive Superheater Company in New York. The present English company is a reorganisation known as the Schmidt Superheating (1910) Co., Ltd.

THE BETHLEHEM STEEL COMPANY

The well known American ordnance works, The Bethlehem Steel Company, have recently been favored by the Republic of Mexico with a large order for war material.

The contract calls for twenty (20) complete batteries of the firm's latest design of three-inch (3") mountain gun, with eighty-thousand (80,000) rounds of high explosive shell and shrapnel for the same, together with a number of six-pounder and three-pounder guns and mounts, and the necessary ammunition.

TRADE BETWEEN THE PHILIPPINES AND INDO-CHINA

The efforts for increased trade relations between Indo-China and the United States have resulted in inquiries for potash, which is an export product of Tonkin, says the *Manila Daily Bulletin*, and continues:—According to latest advices from Hanoi, Speidel and Company and other firms have been requested to send information by several commercial houses on the Pacific coast and in the east.

It is hoped that increased mutual trade relations between the neighboring French colony and the United States will tend to promote a Franco-American understanding in the Far East. For the last two years there was greater intensity in the traditional friendship of the two republics, and the opening of the American market to many French products since the new tariff went into effect has stimulated a move for additional reciprocity.

So far the balance of trade had little equity, specially as regards trade with French colonies, which it is conceded are exclusively administered for the French producer and a high protective tariff makes trade with Indo-China almost impossible.

With the exception of some P.2,000,000, machinery and tools, almost every other article imported into Indo-China was from France.

Manila cigars are imported in very limited quantities, but the goodwill shown on the part of Manila merchants has already resulted in an increased consumption of the Manila product in preference to other imported brands, which fact clearly indicates the appreciation of the French people in Indo-China of American sentiment.

In like manner a large share of the machinery imports could be secured by Manila agents of American manufacturers and it seems at this time advisable for local firms to study the market and make proper connections in the aforementioned French colony.

RAILWAY MUSEUM FOR CHINA

For the purpose of diffusing railway knowledge among the Chinese people, the Minister of Communications proposes to establish a Railway Museum in Likuol Lane behind the building of the Ministry, says a Peking paper, and continues:—The proposed Railway Museum will be placed under the administration of Mr. Hua Nan-kuei, Principal Technical Expert trained in France. The intention of the Ministry in establishing the Museum is to educate the Chinese officials and others as to the necessity of a net-work of railways in the Chinese Republic and also to show foreigners how the Railway enterprise is being pushed forward in this country at the present time. Although this proposed Museum is styled a Railway Museum, departments for the exhibition of telegraphic, postal and navigation articles will be added in future as they are also under the control of the Ministry of Communications. The Government is anxious to have the proposed Railway Museum established as soon as possible so that the Ministry of Agriculture and Commerce may copy the example and establish museums for agricultural and commercial exhibits.

It is stated that the first electrical plant to relieve the Arctic darkness will be erected at the Episcopal Mission at Point Hope. It will be designed, built and equipped by Dr. W. E. Temple, head of the electrical engineering department of the University of Pennsylvania. The site on which the plant will be erected will be 100 miles north of the Arctic circle. A huge windmill will be the prime mover, as the velocity of the wind at Point Hope is said to be rarely less than twenty miles an hour, but an auxiliary petrol motor is to be installed. The mission at Point Hope possesses about 400 inhabitants.

At the recent New York Automobile Show, 87 per cent. of the American cars had an electric engine starting equipment as a standard fitting and as an integral part of the chassis; 1 per cent. of the cars had acetylene starting outfits, and 4 per cent. air starters. As an optional extra electric starters could be fitted to 2 per cent., and mechanical starters to 1 per cent. The most striking point in connection with the above is that in only 5 per cent. of all cars shown was no provision made for some form of engine starter. At Olympia and Paris the percentage was probably the other way about, i.e., possibly 5 per cent. of the cars had some such provision.

At present the greater part of the commerce to the region around Jerusalem passes through Jaffa. This port is a very inferior one and only small coasting vessels can penetrate within the belt of dangerous rocks that encircles it. Large steamers and other ships have to remain in the open sea a mile or two from shore and have their passengers and merchandise landed in large surf boats. Some time ago it was planned to establish a new port at Jaffa. It is only recently, however, that offers were made to obtain the concession. A French company expects to commence operations next summer. The work on the harbour will cost about £1,000,000. There is also a railway concession. A new line will be built from Rayak, on the Beirut—Damascus line to Lydda, on the Jaffa—Jerusalem line. This line will develop the rich plains of Esdraelon and Sharon, and it will be possible to journey from Jerusalem to Constantinople by railway *via* the Aleppo branch of the Baghdad line. Jerusalem's position will thus be greatly improved.

ALPHABETICAL LIST OF ADVERTISERS

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